

TH-77A/E

SERVICE MANUAL

KENWOOD

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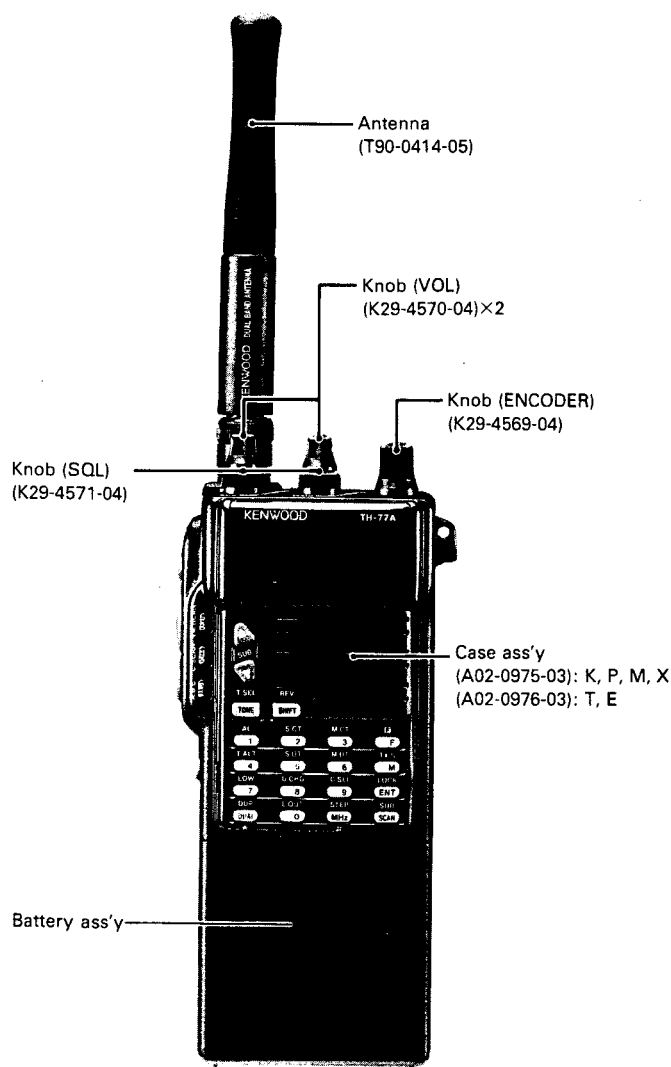


Photo is TH-77A.

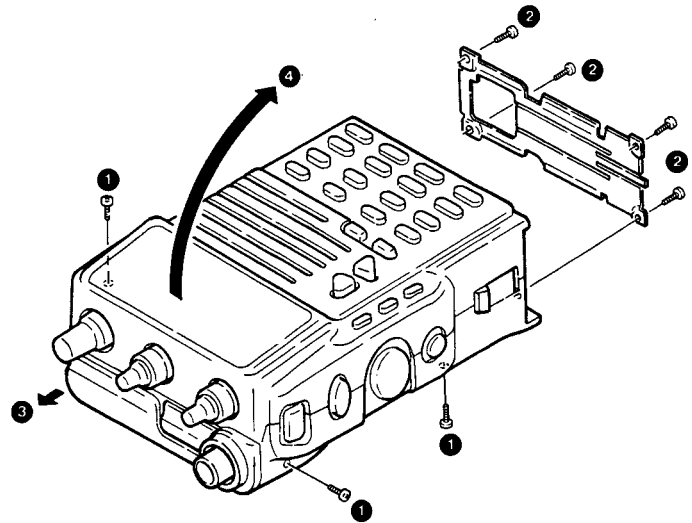
*Refer to parts list on page 29.

DISASSEMBLY FOR REPAIR

1. Removing the case

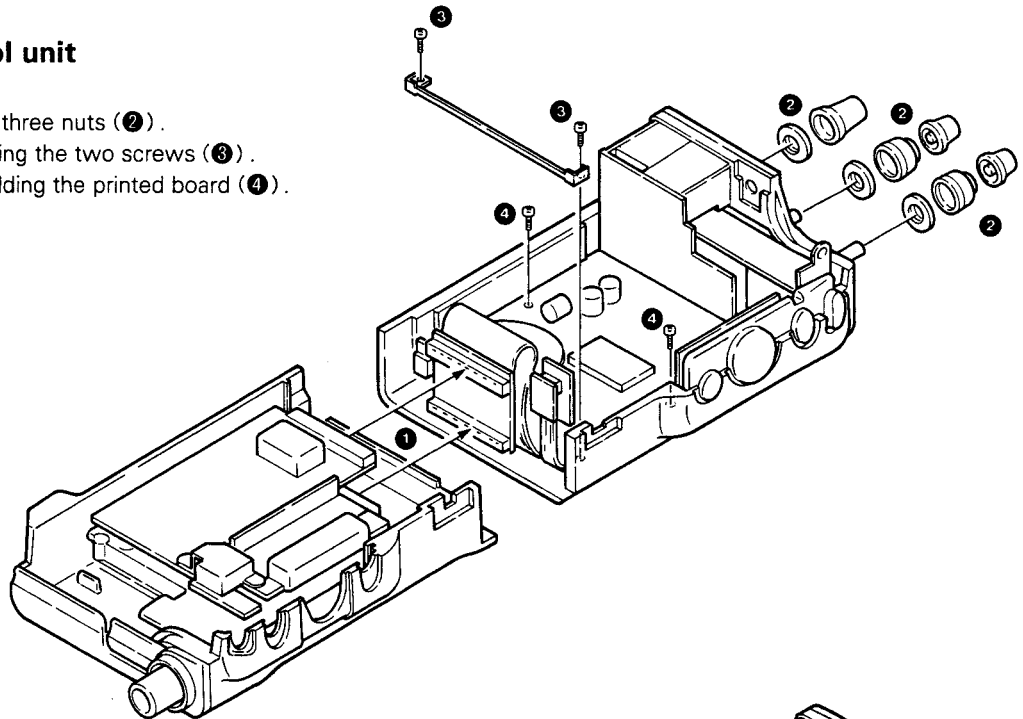
- 1) Remove the three screws from the side faces of the case (1).
- 2) Remove the four screws holding the bottom plate (2).
- 3) Remove the cap from the panel (3).
- 4) Pull up the front case off the panel side (4).

NOTE: This should be done carefully so that the FPC cabling inside the case is not accidentally cut.



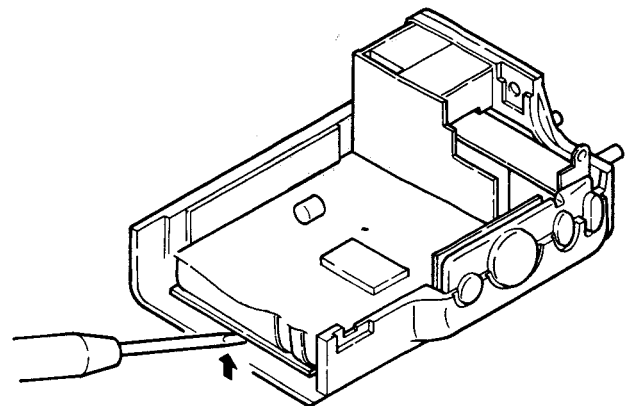
2. Removing the control unit

- 1) Pull out the connector (1).
- 2) Remove the five knobs and three nuts (2).
- 3) Detach the clamp by removing the two screws (3).
- 4) Remove the two screws holding the printed board (4).



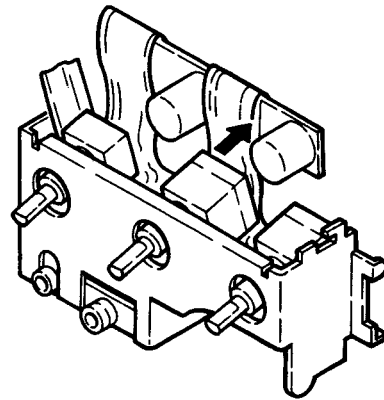
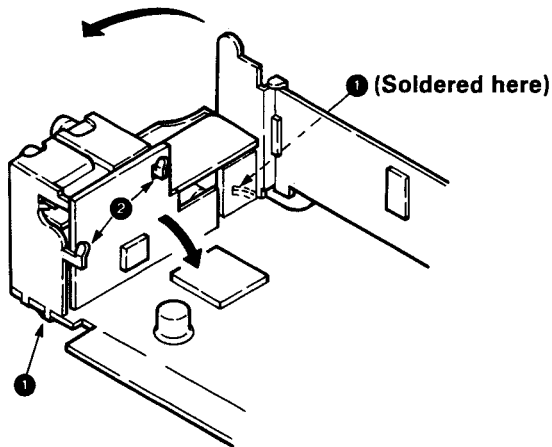
- 5) Raise the control board by inserting a slotted screwdriver between its underside and the front case.

NOTE: The FPC should not be pulled.



DISASSEMBLY FOR REPAIR

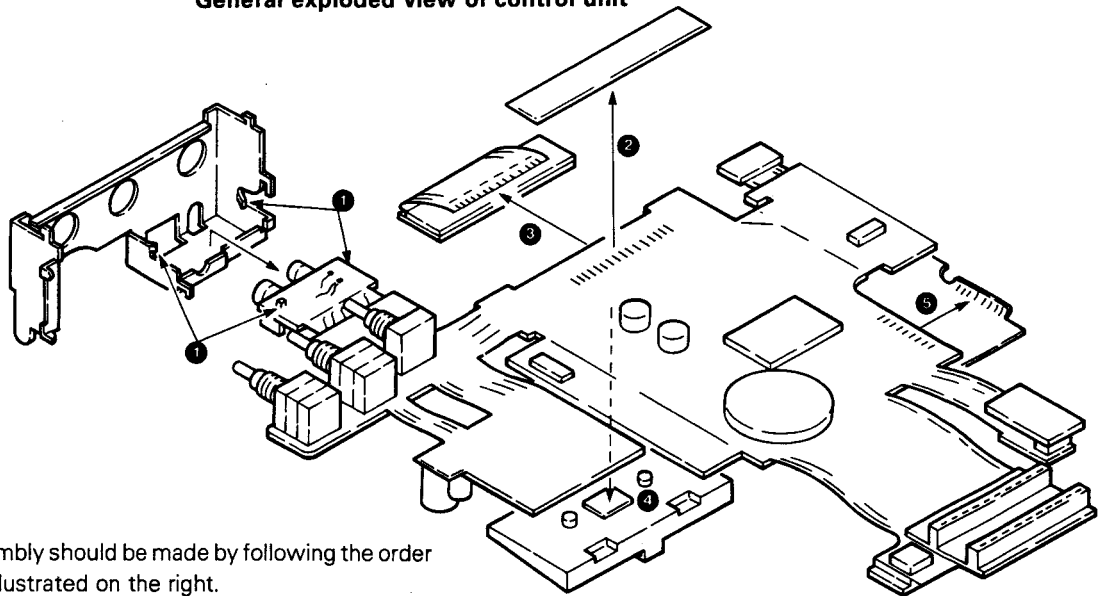
3. Disassembling the control unit



- 1) The panel is fastened by the claws of the sub-panel. Raise the sub-panel by bending the two claws (1).
- 2) Turn down the board by bending another two claws (2).

- 3) Remove the volume encoder from the panel by holding its rear edge.

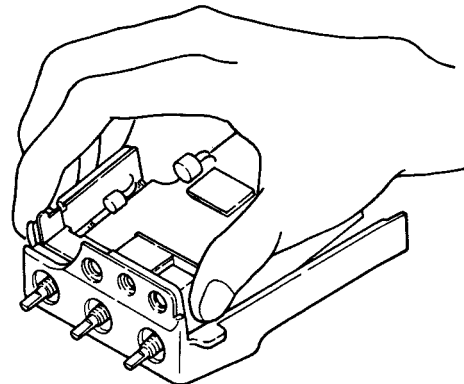
General exploded view of control unit



- 4) Overall disassembly should be made by following the order 1~6 as illustrated on the right.

4. Assembling the control unit

- 1) Hold the sub-panel as shown on the right and fit it inside the panel by aligning the heads of MIC/SP jacks to the holes in the panel.
- 2) Push the PTT knob and control board into position.
- 3) Screw down the control unit, but after tightening the round nuts of the volume encoder (for positioning purpose).



CIRCUIT DESCRIPTION

(1) Frequency Configuration

The TH-77 has independent PLL circuits and intermediate-frequency amplifiers for the VHF and UHF bands. A VHF signal and a UHF signal can thus be received at the same time. The UHF signal can be received at the same time as the VHF signal by doubling the local oscillation frequency for the VHF band. (See Figure 1.)

The received VHF signal is converted to the first intermediate frequency (IF) of 45.05 MHz using the first local oscillator, frequency of 181.05 to 219.05 MHz, and is mixed with the second local oscillator frequency of 45.505 MHz to produce the second IF of 455 kHz.

The received UHF signal band is converted to the first IF of 58.525 MHz using the first local oscillator frequency of 371.475 to 391.475 MHz, and is mixed with the second local oscillator

frequency of 58.070 MHz to produce the second IF of 455 kHz. The local oscillator frequency for the VHF band is doubled, when the UHF signal is received at the same time. The UHF signal is converted to the first IF of 45.05 MHz for the VHF band using a frequency of 384.95 to 404.95 MHz obtained when the first local oscillator frequency of 192.475 to 202.475 MHz for the VHF band is doubled. The resulting frequency is mixed with the second local oscillation frequency of 45.505 MHz to produce the second IF of 455 kHz.

As described above, signal reception for the VHF, UHF, or sub-UHF band is based on a double-conversion system. In the transmit signal channel, a directly oscillated voltage-controlled oscillator (VCO) signal for the VHF and UHF bands is sent to the reactance modulator, amplified to the required level by a linear amplifier, and transmitted.

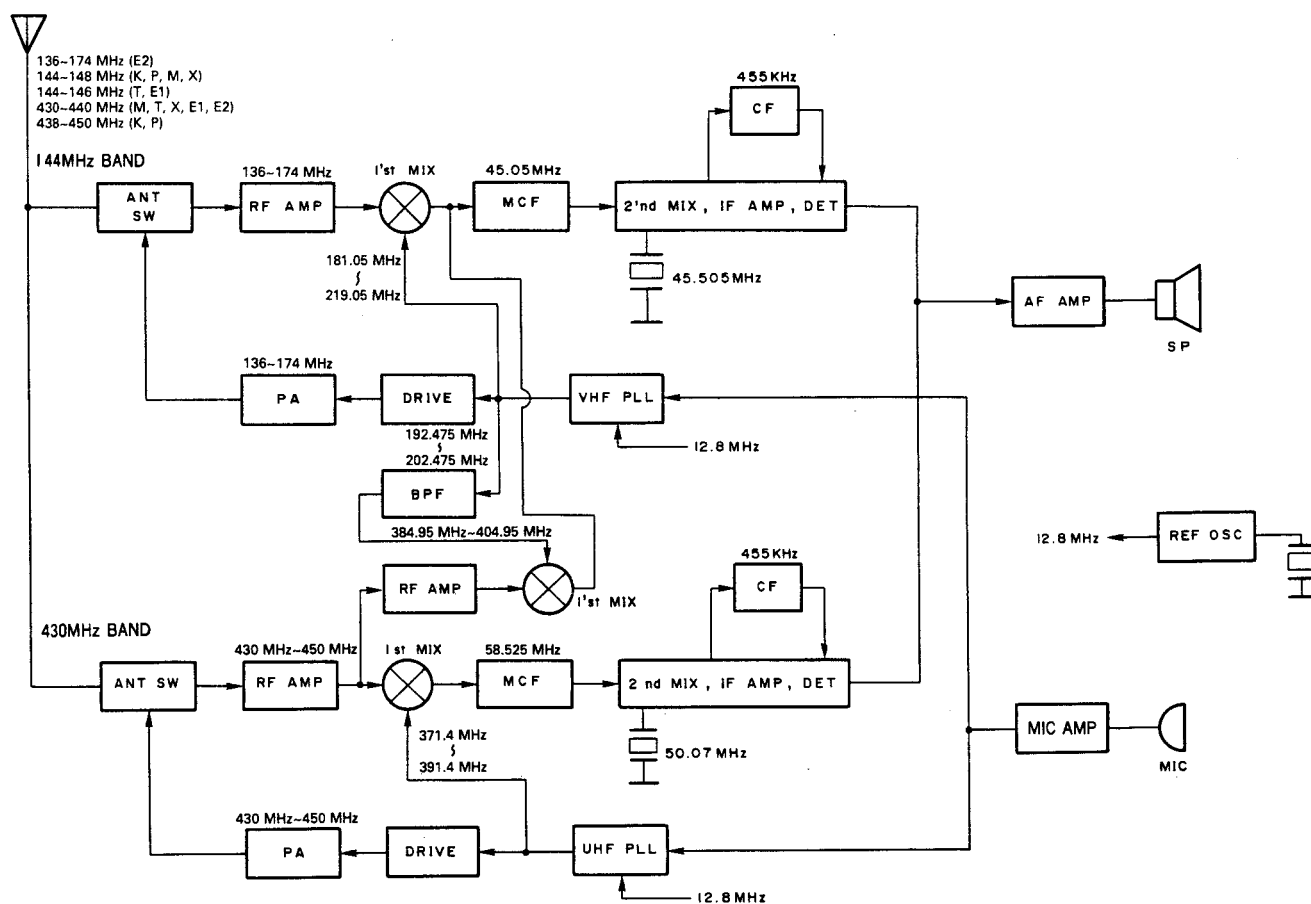


Fig. 1 Circuit configuration by frequency

CIRCUIT DESCRIPTION

(2) Receive Signal Channel

The TH-77 uses common antenna for the VHF and UHF bands, so it has an internal duplexer. The TH-77 also incorporates two audio amplifiers for internal and external speakers. (See Figure 2.)

Item	Rating
Nominal center frequency (fo)	45.050 MHz
Pass bandwidth	fo \pm 7.5 kHz or more at 3 dB
Attenuation bandwidth	fo \pm 22 kHz or less at 25 dB
Guaranteed attenuation	80 dB or more within fo \pm 910 kHz Spurious: 40 dB or more
Ripple	1.0 dB or less
Insertion loss	4.0 dB or less
Terminal impedance	800 Ω /2 pF

Table 1 MCF (L71-0409-05) (TX-RX unit XF1)

Item	Rating
Nominal center frequency (fo)	58.525 MHz
Pass bandwidth	fo \pm 8.5 kHz or more at 3 dB
Attenuation bandwidth	fo \pm 25 kHz or less at 25 dB fo \pm 70 kHz or less at 60 dB
Guaranteed attenuation	80 dB or more at fo \pm 910 kHz
Ripple	1.0 dB or less
Insertion loss	4.0 dB or less
Terminal impedance	380 Ω /3.5 pF

Table 2 MCF (L71-0410-05) (TX-RX unit XF201)

Item	Rating
Center frequency of 6 dB bandwidth (fo)	455 kHz \pm 1.5 kHz
6 dB bandwidth	\pm 7.5 kHz or more
40 dB bandwidth	\pm 15 kHz or less
Ripple	1.5 dB or less (455 kHz \pm 1.5 kHz)
Guaranteed attenuation	27 dB or more within fo \pm 100 kHz
Insertion loss	6 dB or less
Terminal impedance	1.5 k Ω

Table 3 Ceramic filter (L72-0362-05) (IF unit CF1, CF2)

2-1 VHF Receiving Block

The signal from the antenna is passed through a low-pass filter, a duplexer, and antenna switches D4 (M1808) and D5 (MA77), and amplified by Q7 (2SK360). The unwanted band components of the signal are eliminated by a bandpass filter. The resulting signal is mixed with the first local oscillator frequency by first mixer Q6 (2SC4083), and converted to the first IF. The unwanted components of the converted first IF signal are attenuated by a pair of MCFs and amplified by IF amplifier Q5 (2SC4619). The signal is then input to IC2 (MC3372D). The input signal of IC2 is mixed with the second local oscillator frequency, and converted to the second IF. The unwanted components of the converted signal are attenuated by a ceramic filter. The resulting signal is amplified, then detected by a quadrature detector to produce an AF signal.

2-2 UHF Receiving Block

The signal from the antenna is passed through a low-pass filter, a duplexer, and antenna switches D204, D205 (M1808), and D206 (MA77), then amplified by Q207 (2SC4226). The signal is then split into the main UHF and sub-UHF bands by a power divider. The unwanted band components of the signal are attenuated by a helical filter. The resulting signal is amplified by Q206. The signal is mixed with the first local oscillator frequency by first mixer Q205 and converted to the first IF, and the unwanted components are attenuated by a pair of MCFs. The signal is then amplified by IF amplifier Q210 (2SC4215), and input to IC202 (MC3372D). The resulting signal is detected by a quadrature detector to produce an AF signal in the same way as in the VHF receiving block.

2-3 Sub-UHF Receiving Block

The signal from the antenna is input to the UHF receiving block. The input signal of the UHF receiving block is amplified by Q207, split by a power divider, and input to the sub-UHF receiving block. The signal amplified by Q201 (2SC4226) is passed through a bandpass filter to attenuate unwanted signal components. The signal is then mixed with a frequency twice the first local oscillator frequency for the VHF band by first mixer Q202 (2SC4083), then converted to the first IF for the VHF band. The VHF receiving block is used for the signal flow following the first IF signal.

The collectors of the first mixers for the sub-UHF and VHF bands are placed facing each other to prevent the first mixers being influenced by other bands when the bias is turned on or off.

CIRCUIT DESCRIPTION

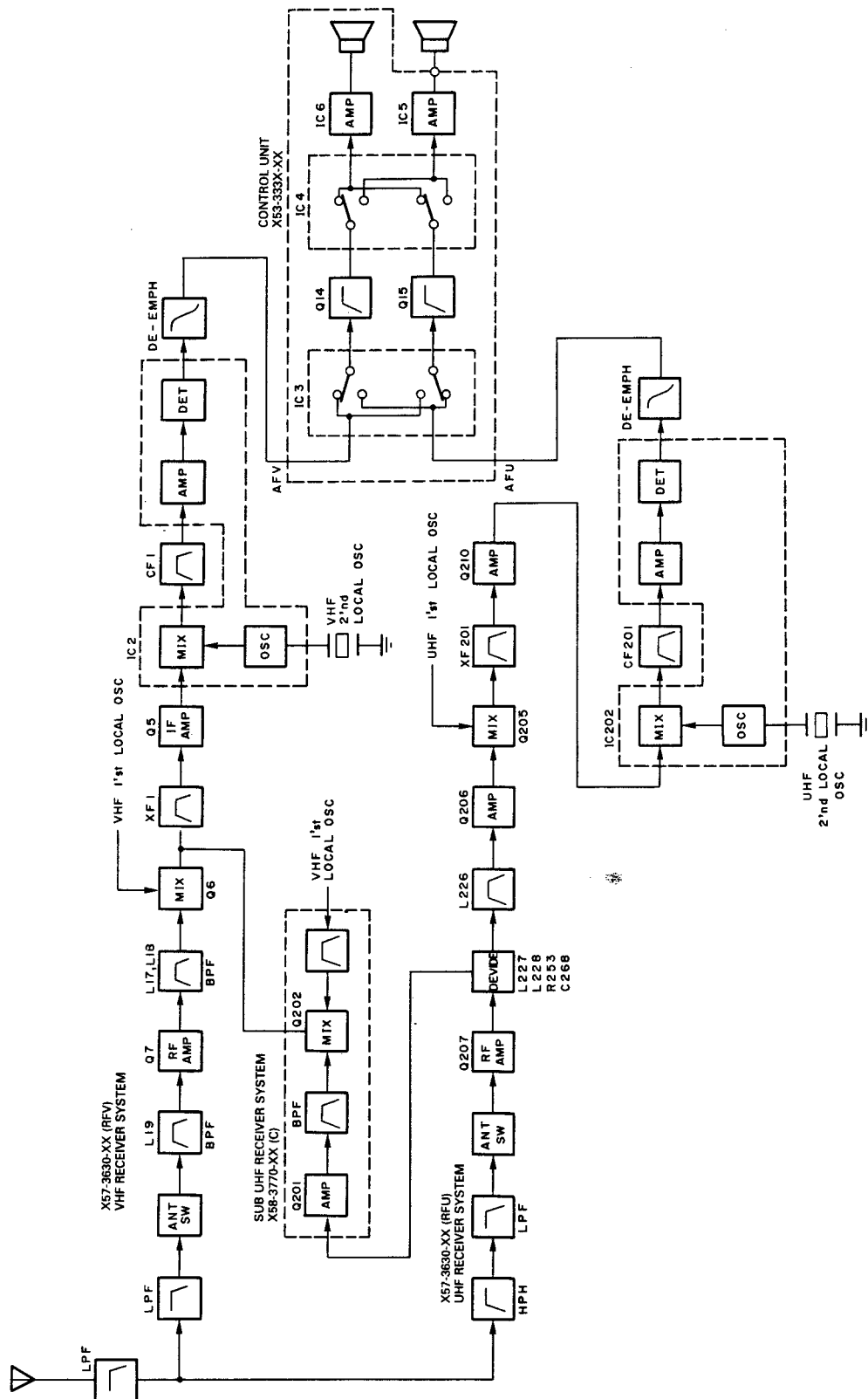


Fig. 2 RX section block diagram

CIRCUIT DESCRIPTION

2-4 Audio Circuit

● Outline

The AFV and AFU signals that are deemphasized in the transmitting-receiving unit are input to control unit IC3 (TC4066BF) and separated into the main signal and subband. The separated signals are passed through high-pass filters and input to IC4, which performs speaker selection and mix/separate selection. The resulting signals are amplified by IC5 and IC6 (NJM386BM), then output.

2-4-1 CTCSS and DTSS selection

Input of the AFV and AFU signals to the CTCSS unit and DTMF decoder is switched by the CBC and DTB signals. The CBC and DTB signals are unstable when the CTCSS, DTSS, and paging functions are off. Figure 3 shows the port status.

2-4-2 Received audio signal selection

The audio signals for the VHF and UHF bands are separated into the main signal and subband by IC3. IC3 opens all switches for muting when it outputs a BEEP pulse. IC4 performs speaker selection and mix/separate selection. Figure 4 shows the port status.

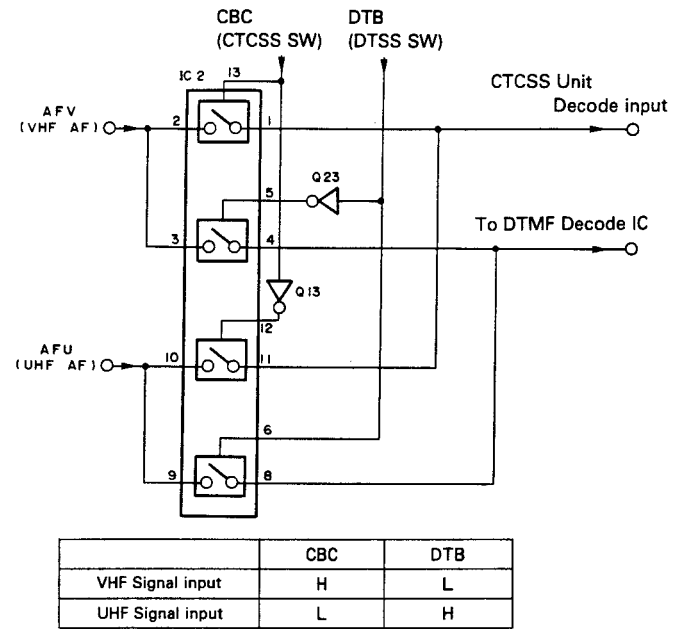


Fig. 3 CTCSS, DTSS switching circuit

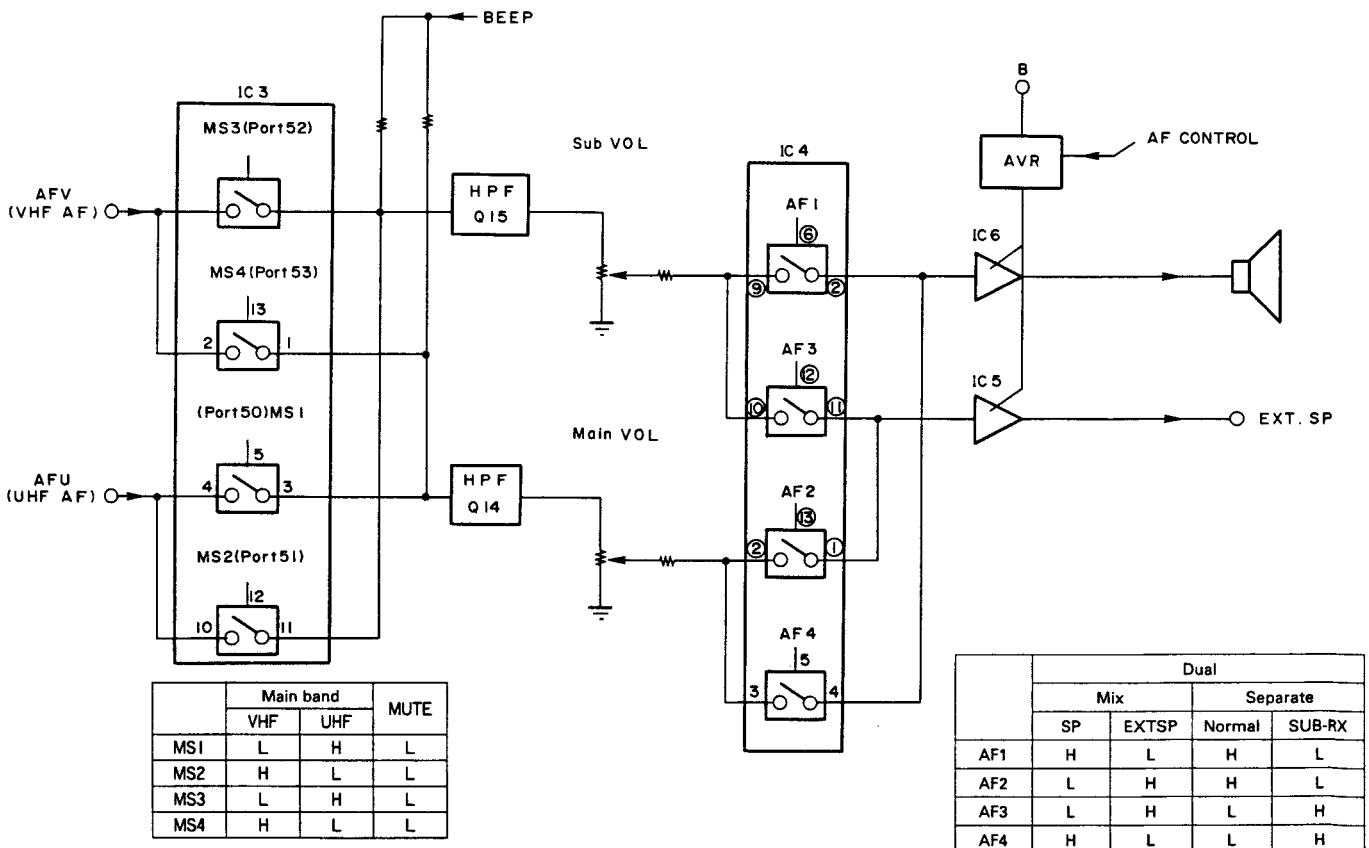


Fig. 4 RX audio switching circuit

* When the normal separate mode is set, the subband is heard on the internal speaker and the main band, on the external speaker.

CIRCUIT DESCRIPTION

2-4-3 External speaker detection

The microcomputer detects that the REM pin of the speaker jack is zero or the remote switch voltage when the speaker plug is inserted. The audio input is then switched from IC6 to IC5 by IC3.

2-4-4 Audio amplifier

Amplifier IC6 (NJM386BM) is used for the internal speaker, and amplifier IC5, for the external speaker. The power for IC6 and IC5 is produced by Q16 (2SB1182) and Q17 (2SC4617). D4 (MA110) and Q18 (DTA144WE) are a power on/off control circuit.

2-4-5 Squelch circuit

Since the squelch circuit for the UHF band is configured identically to that for the VHF band, only the squelch circuit operation for the VHF band is described below. The detection output signal of IC2 is filtered by an internal amplifier in IC2. The noise components of the signal are amplified by Q13. The resulting signal is rectified by D16 to produce a squelch signal. The voltage at the input pin of Q11 is turned on or off by the squelch variable resistor. The SCV signal and hysteresis switches are activated by Q12.

2-4-6 Signal-strength meter circuit

The TH-77 employs signal-strength meter circuits IC2 and IC202 (MC3377D) for the transmitting-receiving unit. For the VHF band, the microcomputer input voltage is adjusted by VR1 of the transmitting-receiving unit. For the UHF band, it is adjusted by VR6 of the control unit. The liquid-crystal display for the VHF and UHF bands appears at the same time. Each signal-strength meter signal is thus added to the input pins of different analog-to-digital converters. The liquid-crystal display consists of five steps in a pair for the VHF and UHF bands.

CIRCUIT DESCRIPTION

(3) Transmit Signal Channel

In the transmit signal channel, a directly oscillated voltage-controlled oscillator (VCO) signal for the VHF and UHF bands is sent to the reactance modulator. The output levels of the microphone amplifiers for the VHF and UHF bands can be adjusted independently. (See Figure 5.)

3-1 Modulator Circuit

The audio signal from the microphone is sent to control unit IC1 (NJM4560M), then a preemphasis circuit, amplifier, limiter amplifier, and splatter filter. The signal is then selected for the VHF and UHF bands by Q12. The frequency deviation can be adjusted by VR3 and VR4. The modulation signal is applied to a varicap diode for voltage-controlled oscillator modulation for the VHF and UHF bands, then sent to the reactance modulator. The input pins are jumpered by Q11 when a dual-tone multifrequency (DTMF) is used.

3-2 Drive Circuit and Final-Stage Amplifier

The voltage-controlled outputs for the VHF and UHF bands are sent to two-stage amplifiers, then amplified to the required level by the RF power amplifier module. The amplified output signals are passed through the antenna switches for the VHF and UHF bands, and sent through a duplexer and lowpass filter to the antenna.

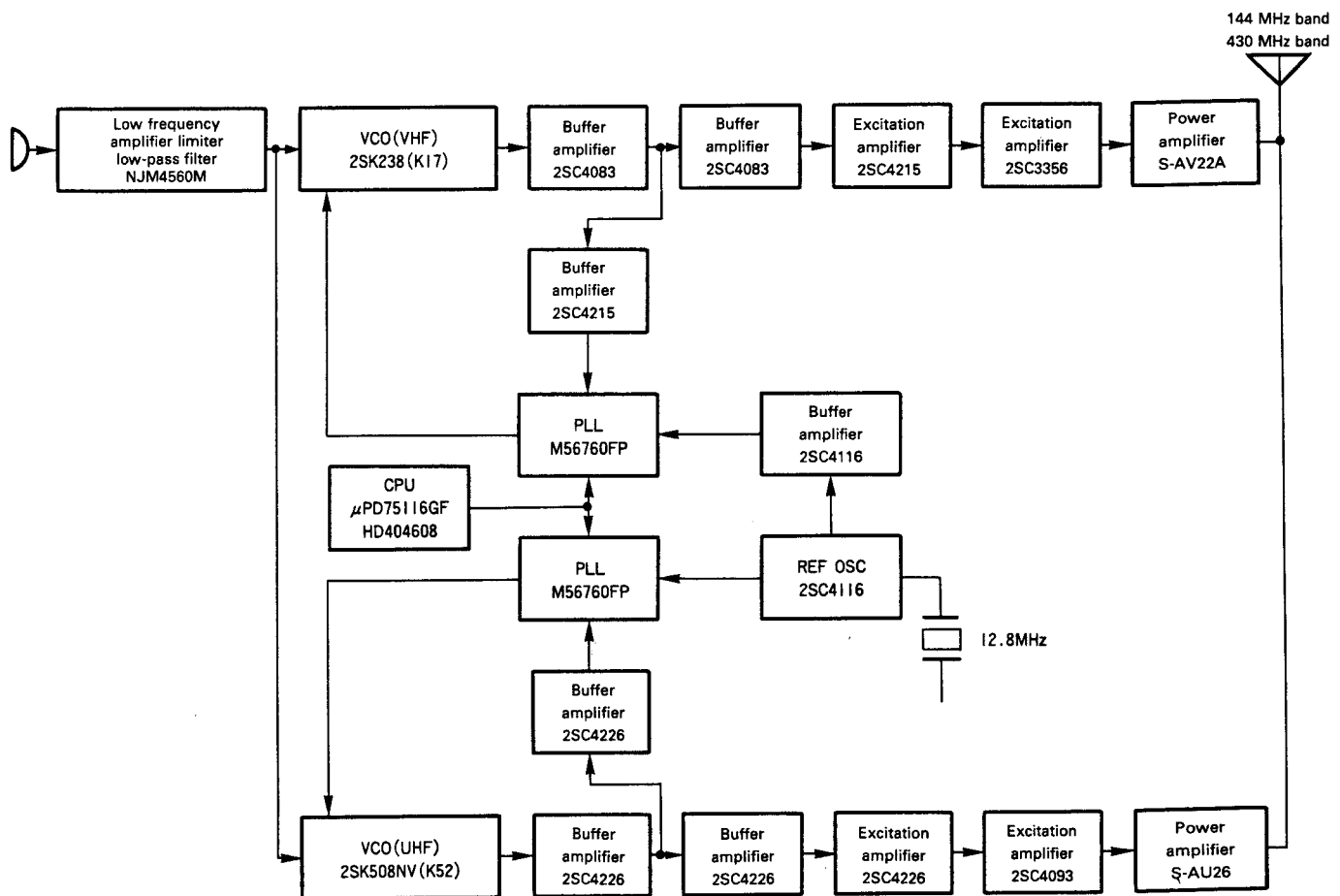


Fig. 5 Transmitter system block diagram

CIRCUIT DESCRIPTION

3-3 APC Circuit

The automatic phase control (APC) circuit produces attain a stable transmission output. This circuit also detects the current of the final-stage amplifier and controls the input power level of the amplifier.

	H/L1	H/L2
Hi	L	L
Mid	H	L
Low	H	H

Table 4

The APC circuit operation for the UHF band is explained below (Figure 6). During transmission, Q4 is turned on by the 5TV and 5TU signals, and IC1 is activated. The output power of IC101 is detected as the voltage drop across R4 and R5. The voltage at both ends of D1, which is completely stabilized by the constant current source of Q1, is compared with the voltage divided by VR1, R11, and VR2. The current flowing through D101 is controlled so that no voltage difference occurs. Consequently, the drive input power of IC101 decreases when the power amplifier module current increases, and the drive power increases when the module current decreases.

For high-, middle-, and low-level selection, Q2 and Q3 are turned on then off when the H/L1 and H/L2 ports are controlled. The reference voltage for IC1 is then switched. (See Table 4.)

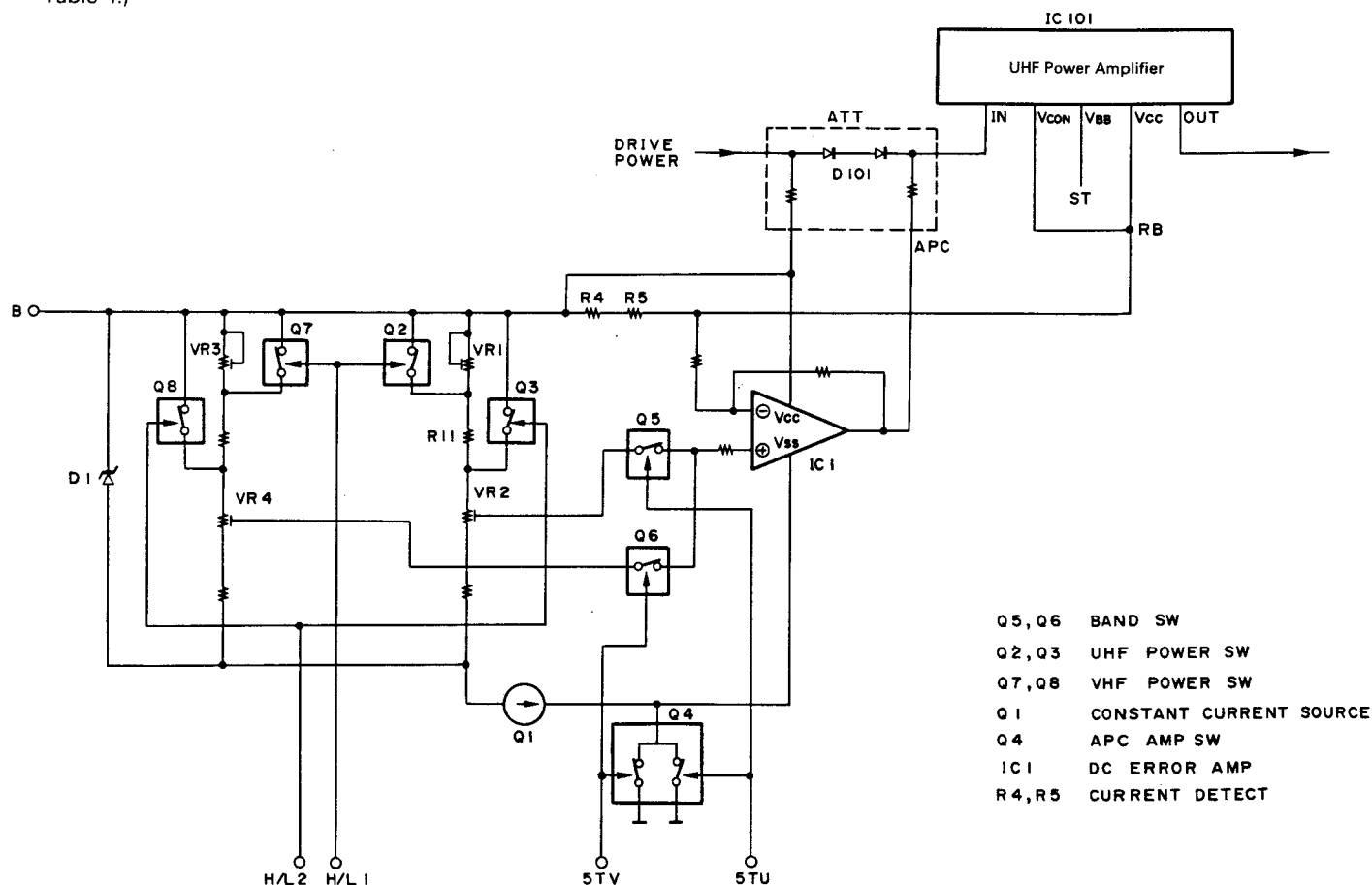


Fig. 6 APC circuit

CIRCUIT DESCRIPTION

(4) Power Supply Circuit

External power is always supplied to IC8 and IC13. The IC8 output is sent to IC10 and IC12. Therefore, the current for IC8 and IC13 and the microcomputer backup current flow when the power is turned off with the battery connected. The PW port of IC10 is made low when the power is turned on. Q20 (1/2) is then turned on. As a result, a reference voltage is applied to each regulator. Power is supplied to the CTCSS unit when Q20 (2/2) is turned on. (See Figure 7.)

The 5C and 5R signals are produced by Q5 and Q6. A 5T signal is produced by Q8 and Q9. The 5C, 5R, and 5T signals are distributed by each switch. The reference OSC power for the phase-locked loop (PLL) circuit is supplied from the 5C signal. The 5RV, 5RVC, and 5CV signals are turned on during VHF reception. The 5RU, 5CU, and 5RU signals are turned on during UHF reception. The 5TV and 5TU signals are turned on according to the band in use during transmission.

(5) Save Circuit

Q7 is controlled by the SAVE pin of IC10. The 5C and 5R regulators of Q5 are then turned on or off to reduce the mean current consumption. The automatic power-off (APO) function interrupts all power supplies to circuits except the microcomputer by turning off Q20. APO operation thus results in the much the same current consumption as when the power is off.

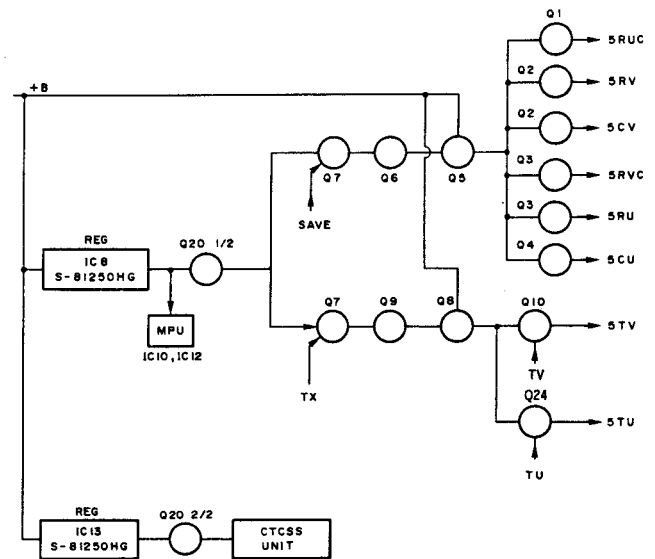


Fig. 7 Power supply circuit

CIRCUIT DESCRIPTION

(6) PLL Circuit

The oscillator circuit consists of reference oscillators with independent phase-locked loop (PLL) and voltage-controlled oscillator (VCO) circuits for both the VHF and UHF bands. The oscillator frequency is sent to the V/U PLL IC.

6-1 PLL

The 12.8-MHz crystal oscillator, X202, is oscillated by Q211. The oscillation output is sent to IC201 and Q212, and the output signal of Q212 is sent to IC1. The reference oscillation frequency is divided by IC1 (VHF) and IC201 (UHF) to produce a reference frequency of 5 kHz or 6.25 kHz.

The VCO output of the comparison frequency is amplified by Q2 (VHF) and Q202 (UHF), then divided by pulse swallow PLL circuits IC1 and IC2. PLL synthesizers with 5-, 10-, 12.5-, 15-, 20-, and 25-kHz steps are established by comparing the phase of the X201 crystal oscillator frequency with that of the divided reference frequency.

6-2 VCO

The desired frequency is produced by direct oscillation by a Colpitts oscillator circuit consisting of VCO-V (X58-3740-00), VCO-U (X58-3760-00), and field-effect transistor (FET) Q2. The VCO control voltage is applied to varicap diodes D1 and D2 to change the oscillation frequency. During reception, the T/R pin is made high, and Q1 and D4 are turned on. The oscillation frequency is then switched. VCO-U makes the T/R pin low during reception and turns Q1 and D3 off to select the range of the oscillation frequency.

6-3 Unlock Detector Circuit

When the PLL circuit is in the unlock mode, the pulses output to the LOCK pins (pin 13) of IC1 and IC201 are waveform-shaped by R6 and C7 for the VHF band and R205 and C208 for the UHF band. The UL pin is then made high. The voltage at the UL pin is detected by the microcomputer to select the transmitter or the receiver and control the timing.

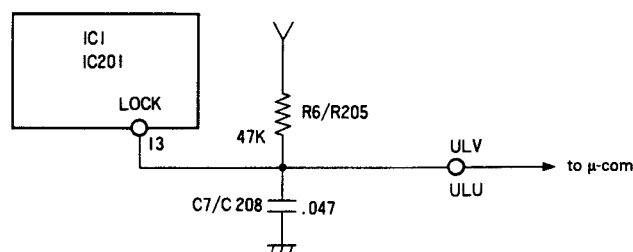


Fig. 9 Unlock Detector Circuit

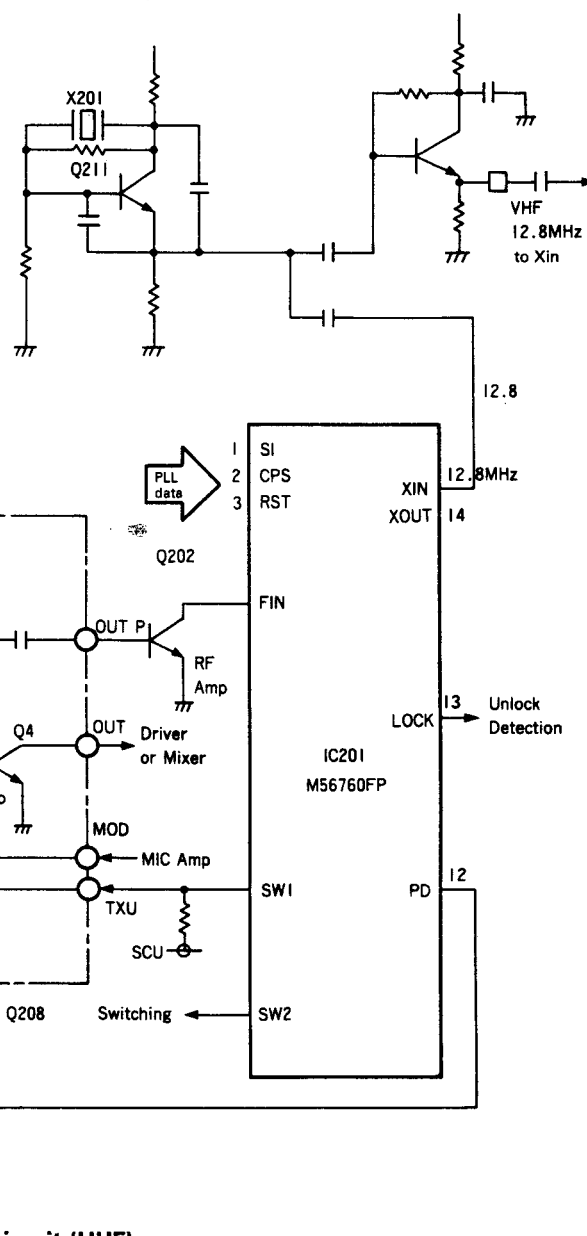


Fig. 8 PLL circuit (UHF)

CIRCUIT DESCRIPTION

(7) Microcomputer and Peripheral Circuits

7-1 Reset and Backup Circuits

A low pulse of approximately 1 ms duration is output from reset circuits C76 and Q19 when the B power is turned on. Microcomputer IC10 is then reset. When the B power is turned off, voltage detector circuit IC9 detects the 5-V line drop and

changes the output signal from high to low. The microcomputer enters the backup mode when microcomputer port INT4 is made low. Microcomputer IC12 is reset by microcomputer IC10.

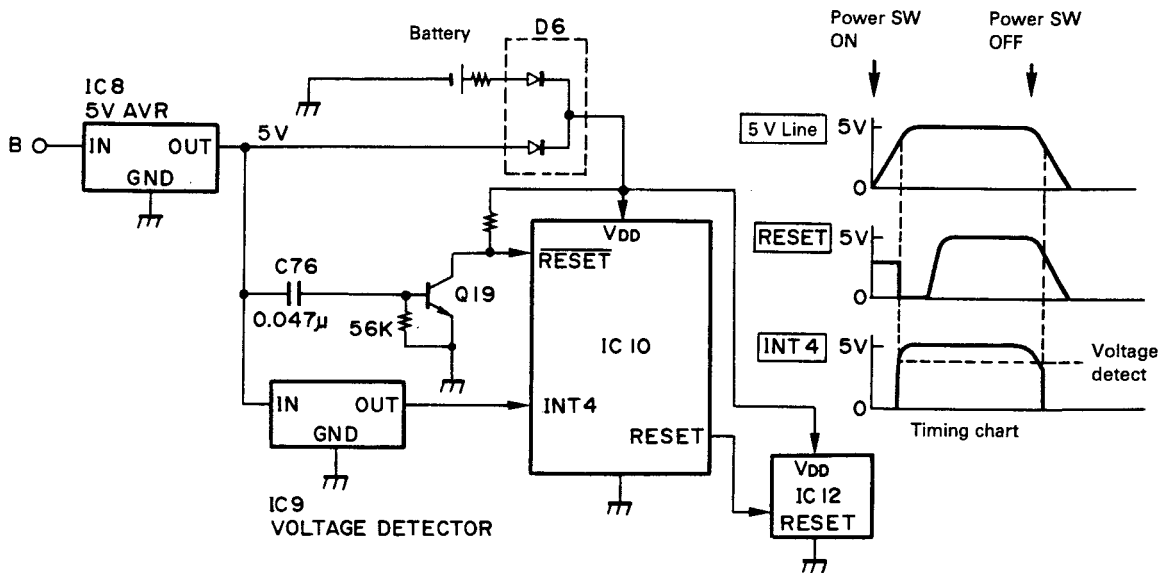


Fig. 10 Reset and backup circuit

CIRCUIT DESCRIPTION

7-2 DTMF and DTSS/PAGING

7-2-1 DTMF encode

A DTMF signal is directly produced using the TOR and TOC signals of IC12. The frequency-response characteristic of the DTMF signal is compensated for by C58, R48, and VR5. The resultant DTMF signal is level-adjusted, then input to pin 3 of IC1. The DTMF monitor signal is sent to the input pins of the main and sub high-pass filters. The audio frequency is muted by IC3.

7-2-2 DTMF decode

The AFV and AFU signals are split up and sent to the CTCSS unit and DTMF decoder by IC2, then sent to IC11. IC11 outputs the code corresponding to the DTMF signal from pins 11 through 14. The output code is compared with the DTSS and PAGING codes by IC10, which determines whether they match.

7-2-3 DTMF decode timing

The main band and sub-band are activated by one DTMF decoder. For a single band, only the main band is checked. For a dual band, the DTMF decoder is switched into the band carrying a BUSY signal to check the band. The other band may not be checked when a BUSY signal is carried in the main band and sub-band at the same time.

7-3 LED Drive Circuit

The LMP pin of IC12 is made high when the lamp switch is pressed. The constant-current circuit consisting of D7, Q21, and R116 is then turned on. As a result, a constant current (40 mA) flows through the LED even if the supply voltage fluctuates.

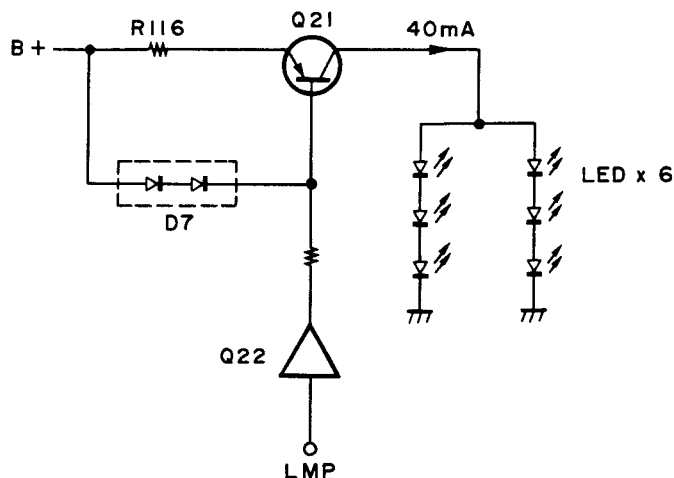


Fig. 12 Lamp circuit

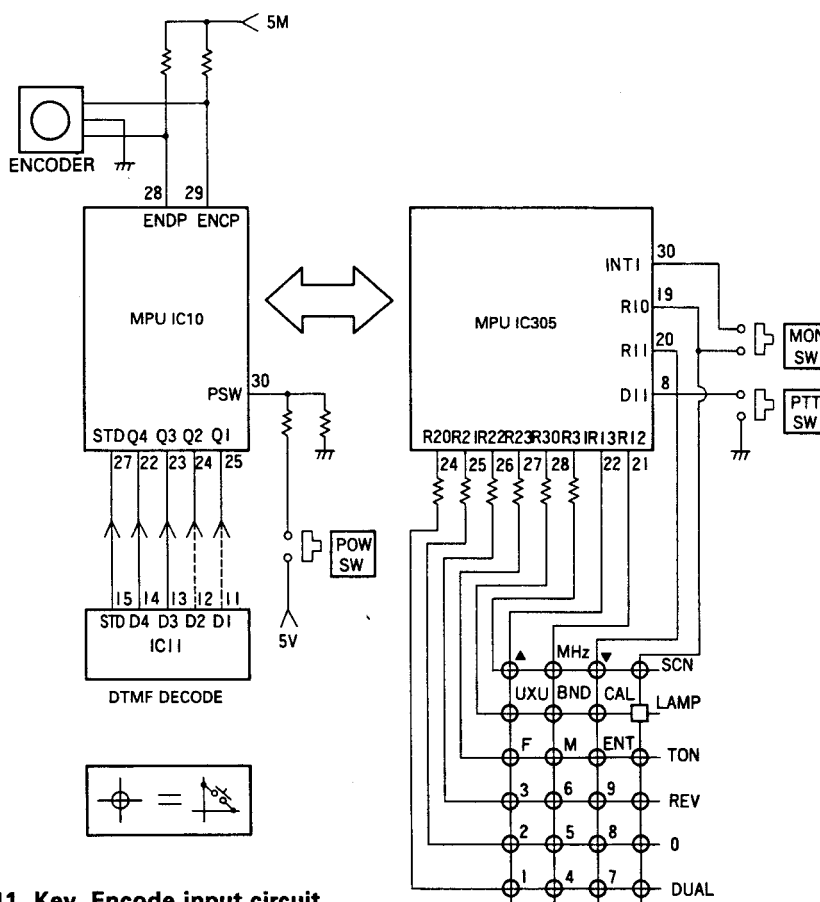


Fig. 11 Key, Encode input circuit

CIRCUIT DESCRIPTION

7-4 Remote Control Microphone Circuit

The remote control microphone circuit has two internal audio amplifiers. The external speaker is directly connected to IC5 via the AFO pin. The speaker microphone and speaker plug connections are detected using the REM and MDT signals. The

REM and MDT signals are made high when the speaker microphone and speaker plug are not connected. The REM and MDT signals are then output from IC6 to the internal speaker. An audio signal is output to the external speaker when the MDT or REM signal is set low.

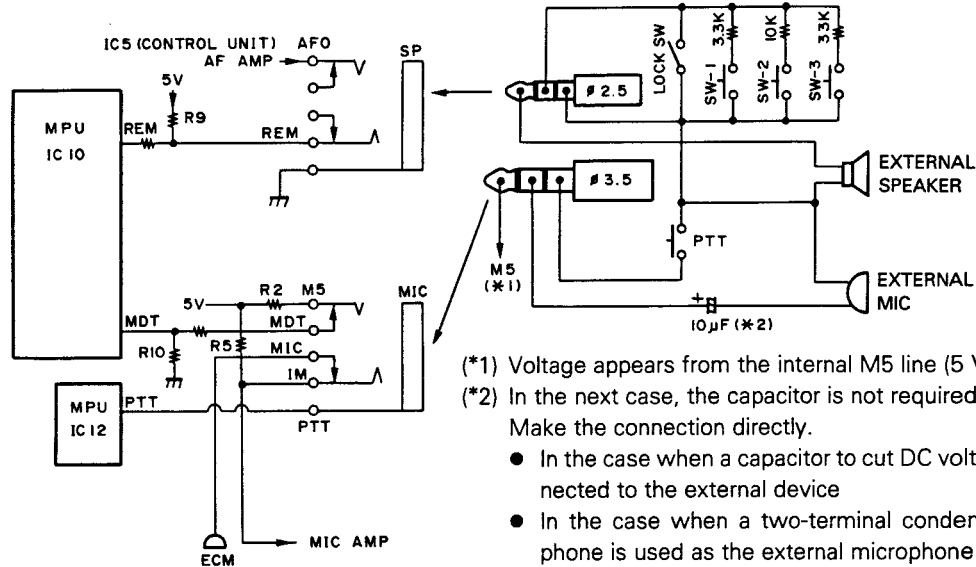


Fig. 13 Speaker, Microphone, Remote circuit

7-5 CTCSS Operation

The CTCSS in the main band and sub-band is checked by the CTCSS timing unit. Only the main band is checked when a single band is used. The band carrying a BUSY signal is checked when a dual band is used with the main band and sub-band CTCSS set on. The main band and sub-band are checked every 500 ms when they carry a BUSY signal. During full-du-

plex operation, the CTCSS in the main band outputs a subtone when the TONE and CTCSS signals are on. Turns the CTCSS in the subband cannot be checked. In that case, the squelch in the subband is opened or closed using only the BUSY signal. For the band in which the CTCSS cannot be checked, the "CT" display disappears only during transmission.

CTCSS CHECK TIMING (MAIN, SUB CTCSS ON)

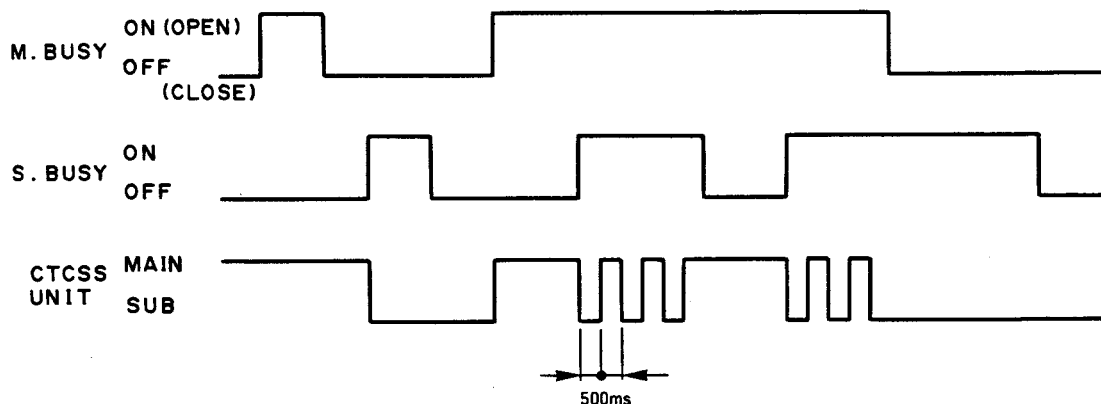


Fig. 14 CTCSS timing chart

Device Functions

1. Control Unit (X53-333X-XX)

Reference No.	Function	Description
Q1	5RUC/5RUOM switch	5RUC: Power switch in the stage after the UHF receiver mixer
Q2	5RV/5CV switch	5RV: VHF receiver RF amplifier/mixer power switch 5CV: VHF PLL power switch
Q3	5RVC/5RU switch	5RVC: Power switch in the stage after the VHF receiver mixer 5RU: UHF receiver RF amplifier power switch
Q4	5RVOM/5CU switch	5RVOM: Subband UHF receiver power switch 5CU: UHF PLL power switch
Q5	5C/5R AVR	
Q6	5C/5R AVR error amplifier	The amplifier is turned on when Q7 is turned on or off.
Q7	Save operation switch	1/2: Off during save operation. 2/3: On during transmission.
Q8	5T AVR	
Q9	5T AVR error amplifier	The amplifier is turned on when Q7 is turned on or off.
Q10	5TV switch	On during VHF transmission.
Q11	Microphone input shorting switch	On while DTMF signal is modulated.
Q12	Modulation output band switch	
Q13	CTCSS input selection control	
Q14	Main audio high-pass filter	
Q15	Sub-audio high-pass filter	
Q16	AF amplifier regulator	
Q17	AF amplifier regulator	
Q18	AF regulator switch	On when AF signal is output.
Q19	Microcomputer reset switch	Low for 1 ms when external power is supplied.
Q20	5M/CTCSS power switch	1/2: Power circuit reference voltage on/off 2/2: On during CTCSS operation.
Q21	Lamp LED constant-current source	
Q22	Q21 switch	On when lamp lights.
Q23	DTMF decoder input selection control	
Q24	5TU switch	On during UHF transmission.
D1	Power reverse-connection protection diode	
D2	AF IC BY pin voltage drop prevention	
D3	AF IC BY pin voltage drop prevention	
D4	AF IC AVR time-constant control	
D5	AF IC BY pin reverse-flow prevention	
D6	Microcomputer backup battery selection	
D7	Constant-current circuit reference voltage	
D8	Backlight LED	
D9	Backlight LED	
D10	Backlight LED	
D11	Backlight LED	
D12	Backlight LED	
D13	Backlight LED	
D14	Electrostatic surge absorption	
IC1	Microphone amplifier	
IC2	DTMF/CTCSS decode selection	
IC3	Selection of AF signal to main band and sub-band	
IC4	Selection of AF signal to internal/external AF amplifier	
IC5	External audio power amplifier	Connected to external speaker socket.
IC6	Internal audio power amplifier	Connected to internal speaker.

Device Functions

Reference No.	Function	Description
IC7	Cross-band repeater AF switch	AF output signal in sub-band is input to microphone amplifier.
IC8	5-V regulator	Used for microcomputer and power circuit reference voltages.
IC9	Backup detection	
IC10	Microcomputer	Power and signaling control
IC11	DTMF decoder IC	
IC12	Microcomputer	Display, key entry, and DTMF signal generation
IC13	CTCSS unit power	

Device Functions

2. TX-RX Unit (X57-3630-XX)

Reference No.	Function	Description
Q1	VCO ripple filter amplifier	
Q2	PLL buffer amplifier	
Q3	VHF driver initial stage	
Q4	VHF driver final stage	Output level: 14 to 15 dBm (typical)
Q5	IF post-amplifier	
Q6	VHF receiver mixer	
Q7	VHF receiver amplifier	
Q8	Power switch	Air band is on. AMR band is off
Q9	Power switch	
Q10	Power switch	Sub-UHF power
Q11	Squelch switch	Turned on or off using noise detection output signal.
Q12	Squelch and hysteresis switches	Turned on or off using output signal of Q11.
Q13	Noise amplifier	
Q201	VCO ripple filter amplifier	
Q202	PLL buffer amplifier	
Q203	UHF driver initial stage	
Q204	UHF driver final stage	Output level: 12 to 13 dBm (typical)
Q205	UHF receiver mixer	
Q206	UHF receiver amplifier second stage	
Q207	UHF receiver amplifier initial stage	
Q208	Power switch	360/800 daughter power switch
Q209	Power switch	360/800 daughter power switch
Q210	IF post-amplifier	
Q211	PLL reference oscillator	
Q212	PLL reference output VHF buffer amplifier	
D1	Ripple filter speed-up	
D2	VCO output selection switch	
D3	APC ATT pin diode	
D4	Antenna switch	
D5	Antenna switch	
D6	Power protection	Internal surge protection
D8	VCO output selection switch	
D9	AGC control diode	IC2 input pin voltage control (for air band)
D10	Receiver filter band shift	
D11	Receiver filter band shift	
D12	Receiver filter band shift	
D13	Sub-UHF power reverse-current prevention	
D15	Power switch reverse-current prevention	
D16	Squelch/noise detection	
D201	Ripple filter speed-up	
D202	VCO output selection switch	
D203	Driver final-stage bias	
D204	Antenna switch	
D205	Antenna switch	
D206	Antenna switch	
D207	VCO output selection	
D208	360/800 power line reverse-current prevention	
D209	UHF power line reverse-current prevention	
D210	Mixer input selection switch	

Device Functions

Reference No.	Function	Description
D211	Mixer input selection switch	
D212	Sub-UHF power line reverse-current prevention	
D213	Receiver block high-input protection	
D214	VCO output selection switch	
D215	360 input selection switch	
D216	VCO output selection switch	
IC1	VHF PLL circuit	
IC2	VHF FM IF system circuit	
IC3	VHF RF power amplifier module	
IC201	UHF PLL circuit	
IC202	UHF FM IF system circuit	

Daughter 1 Unit (X58-3770-00)

Reference No.	Function	Description
Q1	APC constant-current source	
Q2	UHF mid-power setting voltage switch	Jumpers VR1.
Q3	UHF low-power setting voltage switch	Jumpers R11 and VR1.
Q4	APC error amplifier power switch	Turned on using 5TV and 5TU signals.
Q5	Band selection switch (UHF)	Turns the setting voltage on or off with a variable resistor.
Q6	Band selection switch (VHF)	Turns the setting voltage on or off with a variable resistor.
Q7	VHF mid-power setting voltage switch	Jumpers VR3.
Q8	VHF low-power setting voltage switch	Jumpers R19 and VR3.
Q201	Sub-UHF RF amplifier	
Q202	Sub-UHF mixer	
Q301	UHF squelch noise amplifier	
Q302	UHF SCU and hysteresis switches	
Q303	UHF squelch switch	
D1	APC reference voltage generation	
D2	High/Middle/Low selection	5TV and 5TU reverse-current prevention
D3	High/Middle/Low selection	5TV/5TU reverse-current prevention
D101	UHF APC ATT pin diode	
D201	Amplifier high-input signal protection	
D301	UHF noise detection	
IC101	UHF power amplifier module	
IC1	APC error amplifier	

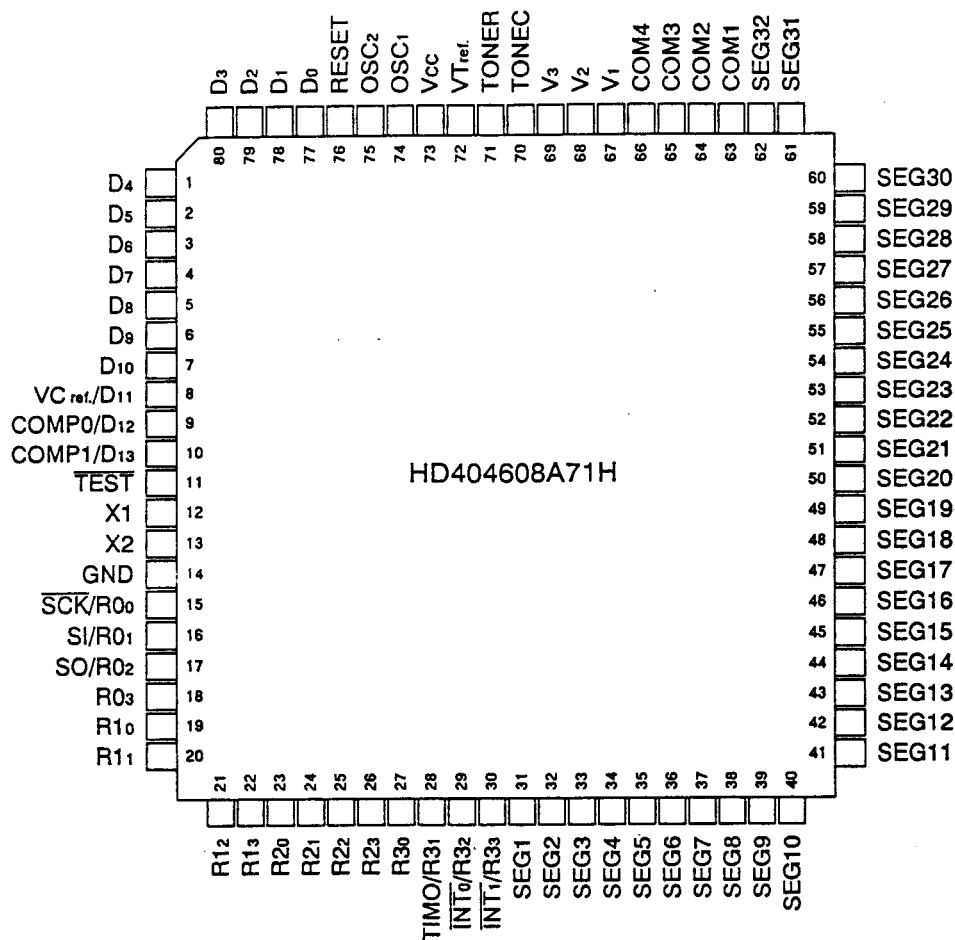
Daughter 2 Unit (X59-3810-00)

Reference No.	Function	Description
Q1	800 RF amplifier	
Q2	Local oscillator doubler	
Q3	Mixer	
Q101	AGC level shift	
Q102	Air band AF amplifier	
Q103	FM discrete short-circuit	
IC101	AM receiver circuit	

SEMICONDUCTOR DATA

Microcomputer HD404608A71H (Control Unit IC12)

●Pin Functions



SEMICONDUCTOR DATA

Microcomputer HD404608A71H (Control Unit IC12)

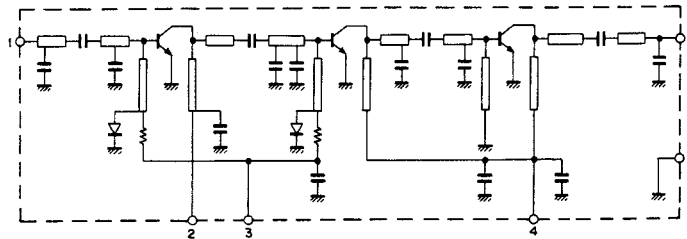
●Pin Functions

Pin No.	Name	I/O	Description
1	D4	O	Transmission power selection Low: H; Middle: H; High: L
2	D5	O	CTCSS (TSU-7) power on/off "H": Off; "L": On
3	D6	O	Cross-band repeater on/off "L": Off; "H": On
4	D7	I	Destination input
5	D8	I	Destination input
6	D9	I	Destination input
7	D10	I	Destination input
8	D11/VCref	I	PTT switch input
9	D12/COMP0	I	Serial interface transmission request input "H": Active
10	D13/COMP1	I	Serial interface serial busy input "H": Active
15	R00/SCK		Serial interface clock
16	R01/SI		Serial interface serial input
17	R02/SO		Serial interface serial output
18	R03	O	Microphone muting "L": Off; "H": On
19	R10	O	Key matrix output
20	R11	O	Key matrix output
21	R12	O	Key matrix output
22	R13	O	Key matrix output
23	R20	I	Key matrix output
24	R21	I	Key matrix output
25	R22	I	Key matrix output
26	R23	I	Key matrix output
27	R30	I	Key matrix output
28	R31/TIMO	I	Key matrix output
29	R32/INT0	I	Backup control
30	R33/INT1	I	Key matrix input
74	OSC1		System lock
75	OSC2		System lock
77	D0	O	Lamp on/off output "H": On; "L": Off
78	D1	O	VHF modulation output on/off "H": Off; "L": On
79	D2	O	UHF modulation output on/off "H": Off; "L": On
80	D3	O	Transmission power selection Low: H; Middle: L; High: L

SEMICONDUCTOR DATA

UHF power module: S-AU26 (SUB unit IC101)

• Equivalent circuit



- 1 : High-frequency input (Pi)
 2 : VCON pin (V1)
 3 : VBB bias pin (V2)
 4 : VCC pin (V3)
 5 : High-frequency output (Po)
 6 : Ground (flange)

• Maximum rating (Tc = 25°C)

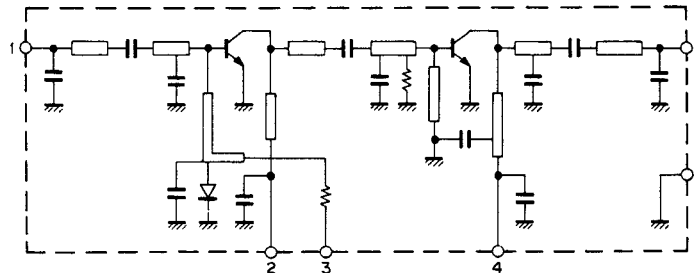
Item	Symbol	Condition	Rating	Unit
Power supply voltage	Vcc	Zg = Zl = 50Ω	15	V
Control voltage	VCON		15	V
Bias voltage	VBB		5.5	V
Input voltage	Pi		24	mW
Output voltage	Po		10	W
Total current	It		4	A
Case temperature during operation	Tc(opr)	—	−30 ~ +100	°C
Storage temperature	Tstg	—	−40 ~ +110	°C

• Electrical characteristics

Item	Symbol	Measurement condition	Min	Typ	Max	Unit
Frequency range	frange	—	430	—	450	MHz
Output power	Po(1)	Pi = 12mW VBB = 5V Zg = Zl = 50Ω	7	—	—	W
Total efficiency	ηT		36	—	—	%
Secondary harmonics	HRM(1)		—	—	−15	dBc
Tertiary harmonics	HRM(2)		—	—	−30	dBc
Output power at low voltage	Po(2)		3	—	—	W
	Po(3)		1.5	—	—	W

VHF power module: S-AV22 (TX-RX unit IC3)

• Equivalent circuit



- 1 : High-frequency input (Pi)
 2 : VCON pin (V1)
 3 : VBB bias pin (V2)
 4 : VCC pin (V3)
 5 : High-frequency output (Po)
 6 : Ground (flange)

• Maximum rating (Tc = 25°C)

Item	Symbol	Condition	Rating	Unit
Power supply voltage	Vcc	Zg = Zl = 50Ω	15	V
Control voltage	VCON		15	V
Bias voltage	VBB		5.5	V
Input voltage	Pi		30	mW
Output voltage	Po		10	W
Total current	It		4	A
Case temperature during operation	Tc(opr)	—	−30 ~ +100	°C
Storage temperature	Tstg	—	−40 ~ +110	°C

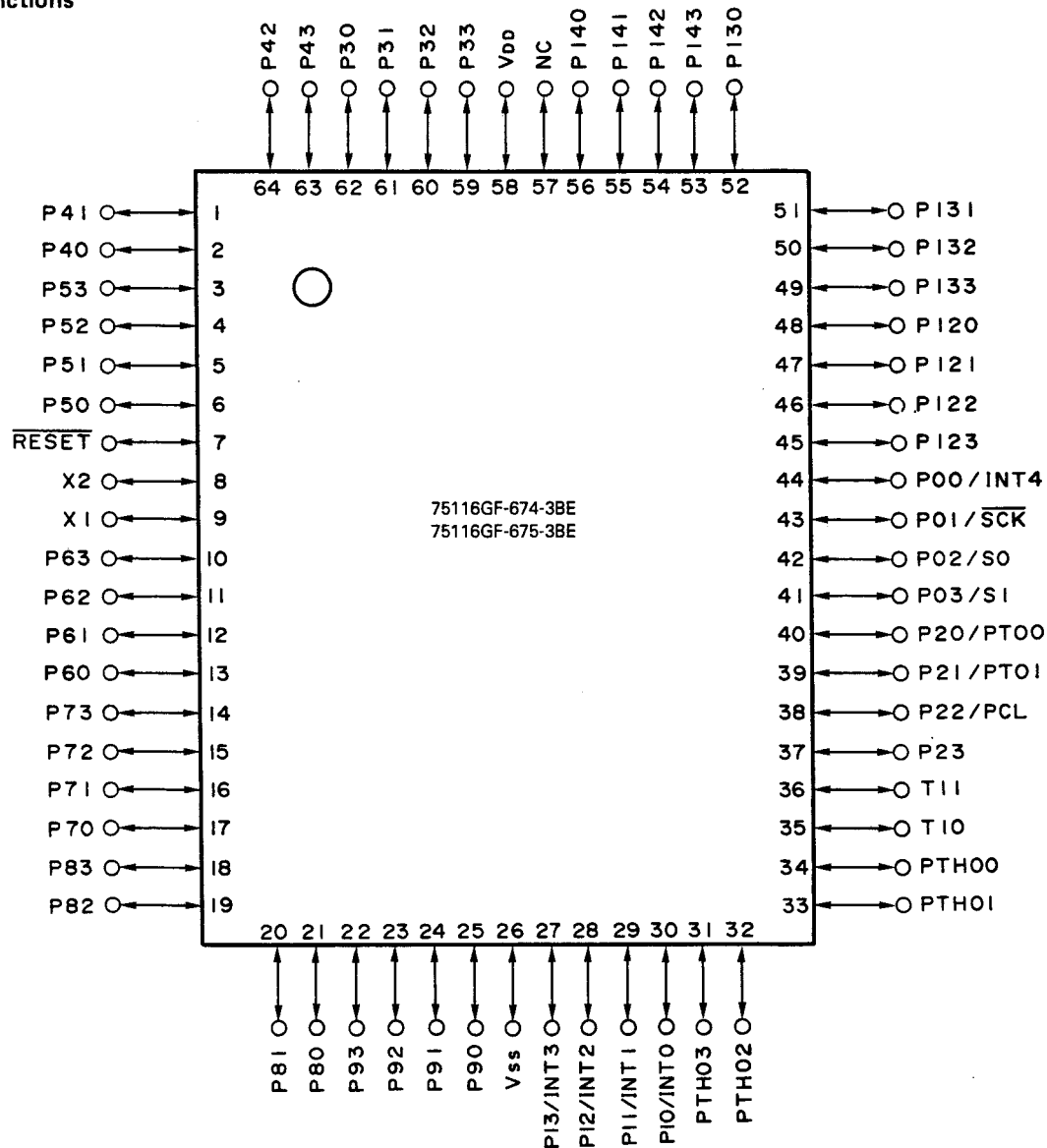
• Electrical characteristics

Item	Symbol	Measurement condition	Min	Typ	Max	Unit
Frequency range	frange	—	144	—	148	MHz
Output power	Po(1)	Pi = 15mW VBB = 5V Zg = Zl = 50Ω	7	—	—	W
Total efficiency	ηT		40	—	—	%
Secondary harmonics	HRM(1)		—	—	−15	dBc
Tertiary harmonics	HRM(2)		—	—	−25	dBc
Output power at low voltage	Po(2)		3.5	—	—	W
	Po(3)		1.5	—	—	W

SEMICONDUCTOR DATA

Microcomputer 75116GF-674-3BE (Control unit IC10): M, X, T, E
 75116GF-675-3BE (Control unit IC10): K, P

•Pin Functions



SEMICONDUCTOR DATA

Microcomputer 75116GF-674-3BE (Control Unit IC10): M, X, T, E
 75116GF-675-3BE (Control Unit IC10): K, P

●Pin Functions

Pin No.	Name	I/O	Description
1	P41	O	Serial interface busy output
2	P40	O	Serial interface transmission request output
3	P53	O	Encoder clock
4	P52	O	Encoder clock
5	P51	O	Transmission power supply "L": On
6	P50	O	Main band or sub-band selection
7	RST	I	Reset input
8	X2		Crystal oscillator input
9	X1		Crystal oscillator input
10	P63	O	DTMF decoder input selection
11	P62	I	CTCSS tone detection
12	P61	I	VHF UNLOCK input
13	P60	I	UHF UNLOCK input
14	P73	O	VHF PLL enable
15	P72	O	UHF PLL enable
16	P71	O	Data
17	P70	O	Clock
18	P83	O	Clock
19	P82	O	Clock
20	P81	O	Clock
21	P80	O	AF output selection
22	P93	I	AF output selection
23	P92	I	AF output selection
24	P91	I	AF output selection
25	P90	I	DTMF decoder data input
27	INT3 P13	I	DTMF decoder tone detection (STD)
28	INT2 P12	I	Encoder data
29	INT1 P11	I	Encoder clock
30	INT0 P10	I	Power switch
31	PTH03	I	Remote control analog input
32	PTH02	I	Battery analog input
33	PTH01	I	Signal strength meter UHF analog input
34	PTH00	I	Signal strength meter VHF analog input
35	T10	I	UHF squelch input
36	T11	I	VHF squelch input
37	P23	O	DTMF data enable
38	PCL P22	O	DTMF power switch "L": Active
39	PTO1 P21	O	TSU-7 data enable
40	PTO0 P20	O	Beep sound and 1750 Hz tone output
41	SI P03		Serial interface serial input
42	SO P02		Serial interface serial output
43	SCK P01		Serial interface clock
44	INT4 P00	I	Power detection "H": On; "L": Off
45	P123	O	5M power supply "L": On
46	P122	O	AF power supply "L": On
47	P121	O	VHF transmission "L": On
48	P120	O	UHF transmission "L": On
49	P133	O	Transmission power supply "L": On
50	P132	O	Save "H": On

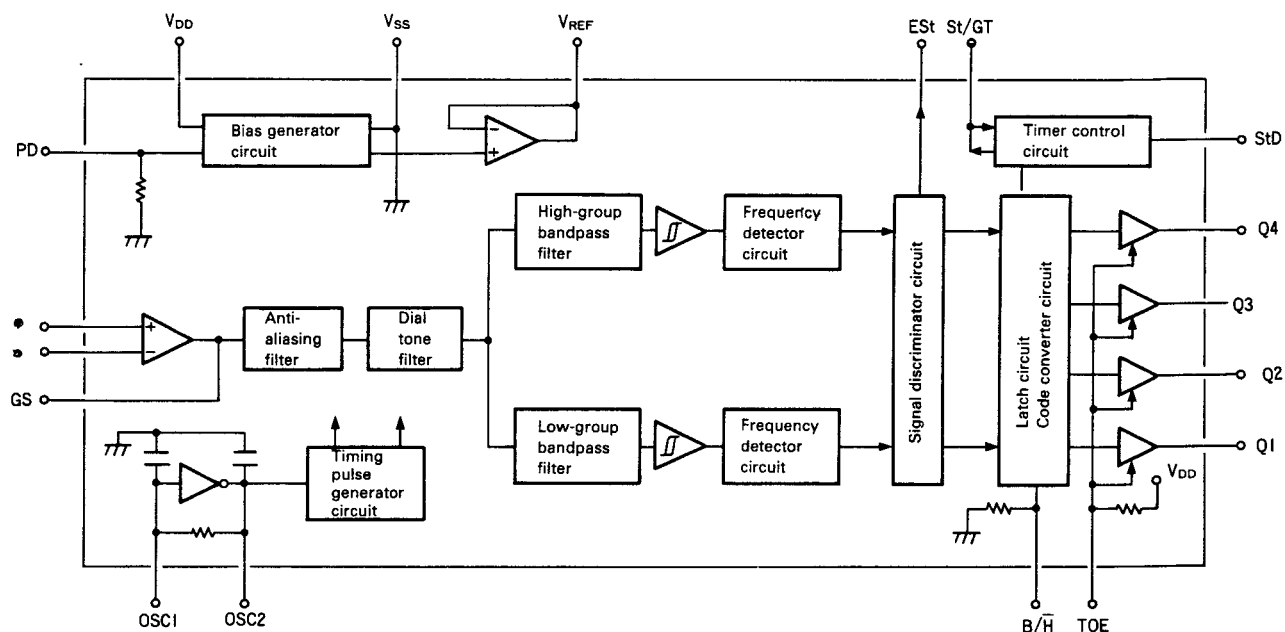
SEMICONDUCTOR DATA

Pin No.	Name	I/O	Description
51	P131	O	UHF PLL power supply "L": On
52	P130	O	VHF additional reception (AIR, SUB-UHF) "L": On
53	P143	O	UHF amateur reception "L": On
54	P142	O	VHF band reception "L": On
55	P141	O	VHF PLL power supply "L": On
56	P140	O	VHF amateur reception "L": On, On during AM reception
59	P33	O	UHF band additional reception (360, 800) "L": On
60	P32	O	UHF band reception "L": On
61	P31	I	Speaker microphone connection check "L": Connected
62	P30	O	TSU-7 decoder input selection
63	P43	O	HD404608 reset "H": Reset
64	P42	O	HD404608 INT0 "L": Active

SEMICONDUCTOR DATA

DTMF Decoder LC7385M (Control Unit IC11)

●Block Diagram



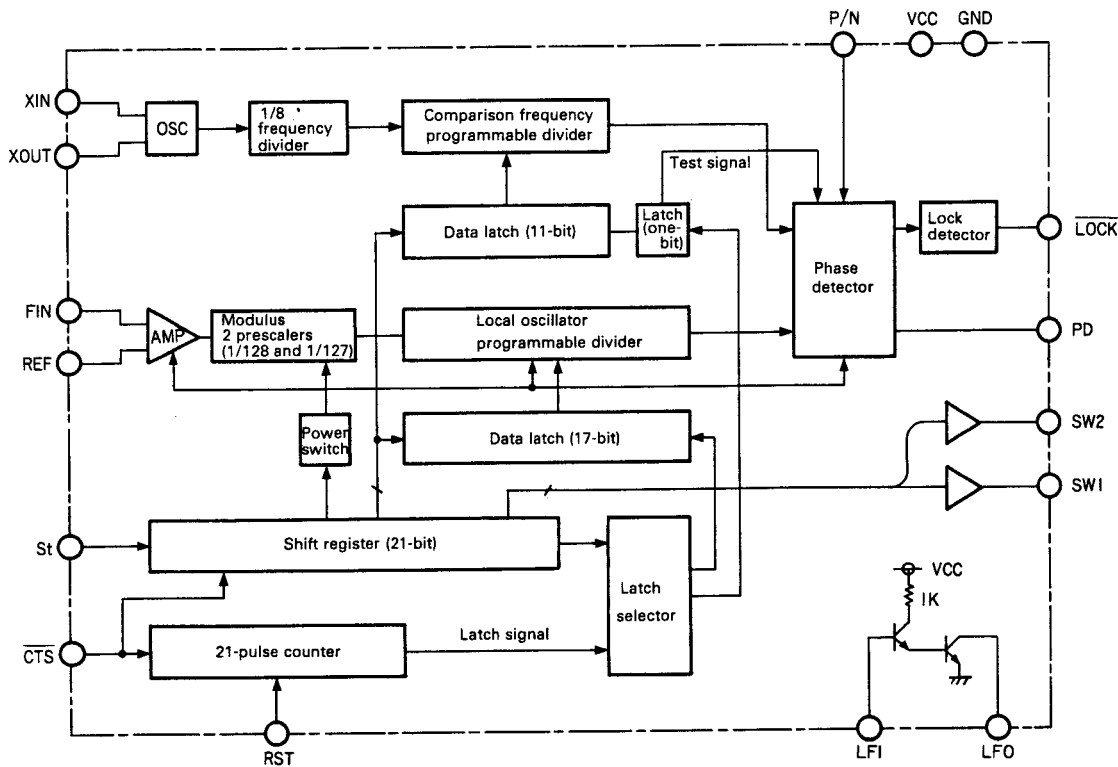
●Pin Functions

Pin No.	Name	I/O	Description
1	IN+	I	Input amplifier non-inverting input
2	IN-	I	Input amplifier inverting input
3	GS	O	Input amplifier output
4	V _{REF}	O	V _{DD} /2 reference voltage output
5	B/H	I	Selects the output formats of Q1 to Q4. Hexadecimal when low. Binary (two of eight code) when high.
6	PD	I	Power-down mode when high.
7	OSC1	I	Crystal oscillators producing 3.57954 and 3.579545 MHz are connected between the OSC1 and OSC2 pins to constitute an oscillator circuit.
8	OSC2	O	
9	V _{SS}		Power pin. Usually set to 0 V.
10	TOE	I	Controls the tristate outputs of Q1 to Q4. Enabled when high; high impedance when low.
11	Q1	O	Tristate received data output
12	Q2		
13	Q3		
14	Q4		
15	StD	O	High when the continuation time of a valid tone pair exceeds the time set by the external CR.
16	ESst	O	Set high when a valid tone pair is detected.
17	St/GT	I/O	Connected CR sets the guard time.
18	V _{DD}		Power pin. Usually set to 5 V.

SEMICONDUCTOR DATA

PLL Circuit M56760FP (TX-RX Units IC1 and IC201)

●Block Diagram



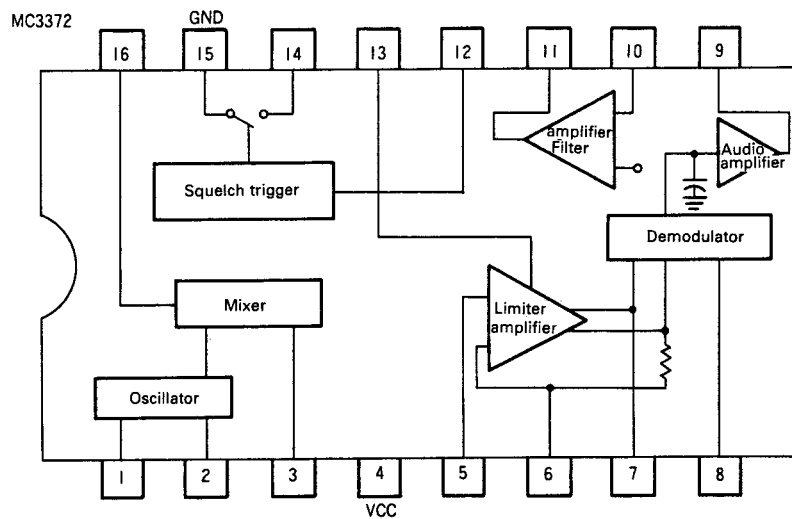
●Pin Functions

No.	Symbol	Pin name	Description
1	SI	Data input	Shift register data input
2	CPS	Clock pulse input	Shift register clock pulse input
3	RST	Reset pulse input	21-pulse counter reset pulse input
4	REF	Reference bias	Grounded by a 1000 pF capacitor.
5	FIN	Local oscillator input	Local oscillator frequency (VCO) input. 540 MHz (max)
6	SW1	Output port 1	The output port status can be set by the transfer data from the controller.
7	SW2	Output port 2	
8	GND	Ground	Ov
9	P/N	Phase detector polarity selection input	The PD pin is high during phase advance when high, and low during phase delay. It is low during phase advance when low, high during phase delay.
10	LFO	Filter output	Low-pass filter transistor collector output
11	LFI	Filter input	Low-pass filter transistor base input
12	PD	Phase detection output	Tristate output
13	LOCK	Lock detection output	"L": during PLL lock, "H": during unlock. Open collector
14	XOUT	Crystal oscillator input	The output of a 12.8-MHz reference oscillator is input to the XIN pin. An external crystal can also be used.
15	XIN		
16	V _{CC}	Power	3.0~5.5 V

SEMICONDUCTOR DATA

FM Receiver Circuit MC3372D (TX-RX Units IC2 and IC202)

●Block Diagram



●Pin Functions

Pin No.	Name	Description
1	OSC In	A Colpitts oscillator circuit is set up by connecting a crystal oscillator. A signal is input to pin 1, and pin 2 is connected to Vcc when an external oscillator is used.
2	OSC Out	
3	MIX Out	Mixer output
4	Vcc	Power
5	LIM In	Limiter amplifier input and decoupling (or output). Pins 6 and 7 are AC-grounded (or a feedback resistor and phase meter capacitor are connected to pin 7).
6	DEC1	
7	DEC2 (LIM Out)	
8	QUAD In	Phase meter connection
9	AF Out	An FM detected signal is output.
10	FAmp. In	Operational amplifier inverting input
11	FAmp. Out	Operational amplifier output
12	SQSW In	Squelch switch input
13	Smeler Out	A current corresponding to the limiter amplifier input signal level is output.
14	SQSW Out	Squelch switch output
15	GND	Ground
16	MIX In	Mixer input

Note: The explanation in parentheses refers to FM receiver circuit MC3372.

PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
TH-77A/E						
1	3B	*	A01-2004-02	METALLIC CABINET(REAR)	KMX TE1E2	
2	1A	*	A02-0975-03	PLASTIC CABINET ASSY(FRONT)		
2	1A	*	A02-0976-03	PLASTIC CABINET ASSY(FRONT)		
3	2A	*	A22-0772-03	SUB PANEL		
4	1A	*	A40-0627-04	BOTTOM PLATE		
5	3B	*	B09-0323-03	CAP((SP/MIC/DC)	K	
6	1A	*	B11-0486-03	FILTER		
			B42-2437-04	S/NØ LABEL		
			B42-3394-04	LABEL(LA)		
			B44-2163-04	LABEL(UPC)		
13		*	B62-0007-00	INSTRUCTION MANUAL	KTX	
13		*	B62-0008-00	INSTRUCTION MANUAL	MPE1E2	
60		*	B62-0017-00	INSTRUCTION MANUAL	E1E2	
		*	B72-0015-04	MODEL NAME PLATE	KP	
		*	B72-0016-04	MODEL NAME PLATE	MX	
		*	B72-0017-04	MODEL NAME PLATE	TE1E2	
10			B46-0410-20	WARRANTY CARD	K	
10			B46-0419-00	WARRANTY CARD	E1E2	
10			B46-0422-00	WARRANTY CARD	P	
15	3B	*	E04-0181-05	RF COAXIAL CABLE RECEPT(BNC)	M	
57		*	E19-0254-05	PLUG(CHARGER)		
16	2B	*	E23-0653-04	TERMINAL(DC +)		
17	1B	*	E23-0654-04	TERMINAL(DC -)		
		*	E37-0050-05	SP WIRE		
19			F07-0896-13	COVER(BM-1)		
20		*	F07-1202-03	COVER(KEY)		
21	2B	*	F10-1450-02	SHIELDING PLATE(UHF)		
22	1A		F19-0666-04	BLIND PLATE(MIC)		
			F20-1024-24	INSULATING BOARD(JACK)		
		*	F20-1046-04	INSULATING BOARD(LCD)	K	
		*	F20-1047-04	INSULATING BOARD(BOTTOM)		
		*	F20-1067-04	INSULATING BOARD		
			F29-0435-05	INSULATOR(BELT HOOK)		
28	1A		G02-0505-05	KNØB FIXED SPRING(VØR,ENC)	KP	
		*	G10-0635-04	FORMED PLATE(ØNT)		
			G10-0692-04	FORMED PLATE(TØNE)		
31	1B	*	G13-0965-04	FORMED PLATE(DC TERMINAL)		
		*	G13-1304-04	CUSHION(ENCØDER)		
33	2A	*	G53-0596-03	PACKING(SUB PANEL)		
		*	H10-2695-02	PØLYSTYRENE FØAMED FIXTURE	KTX X	
35			H11-0808-14	PØLYSTYRENE PLATE(TØP)		
59			H11-0840-04	PØLYSTYRENE PLATE		
36			H13-0818-04	PØLYSTYRENE PLATE(BELT HØØK)		
35			H13-0823-04	PØLYSTYRENE PLATE	MP	
37			H13-0841-04	PØLYSTYRENE PLATE(CHARGER)	KMTP	
37			H13-0841-04	PØLYSTYRENE PLATE(CHARGER)	E1E2	
55		*	H21-0719-04	PACKING		
40			H25-0085-04	PROTECTION BAG		
41		*	H52-0009-04	ITEM CARTØN BØX(TH-77A)	KP	
41		*	H52-0010-04	ITEM CARTØN BØX(TH-77A)	MX	
41		*	H52-0011-04	ITEM CARTØN BØX(TH-77E)	TE1E2	

E: Scandinavia & Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

TH-77A: K, P, M, X

TH-77E: T, E1, E2

⚠ indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
42	1B	*	J19-1460-03	HOLDER(BATTERY TERMINAL)		
43	2A	*	J21-4313-04	MOUNTING HARDWARE(BOTTOM CASE)		
44			J29-0424-04	BELT HOOK(ACSY)		
45	1A		J39-0440-14	SPACER(MIC)		
46			J69-0312-04	HAND STRAP(ACSY)		
47	1A		K29-4564-04	KNØB ASSY(RELEASE)		
48	1A	*	K29-4569-04	KNØB ASSY(ENCODER)		
49	1A	*	K29-4570-04	KNØB ASSY(VOL)		
50	1A	*	K29-4571-04	KNØB ASSY(SQL)		
51	3B	*	K29-4572-03	KNØB ASSY(PTT)		
52	1A	*	K29-4574-03	KNØB ASSY(KEY TOP)		
A	2A		N09-2009-15	SCREW(2X4.5)		
B	3B		N09-2024-05	SCREW(2X16)		
			N09-2028-05	SCREW(M3X4) BELT HOOK		
D	1B, 3B		N09-2064-05	SCREW(M2X3.5)		
E	2A, 2B	*	N09-2128-05	SCREW(2X4)		
F	1A	*	N09-2129-05	SCREW(M2X5)		
J	2B	*	N09-2139-05	SCREW(2X10.5)		
G	1A		N14-0534-04	NUT(VOL, ENC)		
H	3B	*	N30-2605-45	PAN HEAD MACHINE SCREW		
I	2B	*	N30-2614-46	PAN HEAD MACHINE SCREW		
SP	1A	*	T07-0266-05	LOUDSPEAKER(FULLRANGE)		
54		*	T90-0414-05	ANTENNA(ACSY)		
58			W09-0385-05	BATTERY CHARGER(120V)	P	
58			W09-0317-15	BATTERY CHARGER(220V)	E1E2	
58			W09-0318-15	BATTERY CHARGER(240V)	T	
58			W09-0382-15	BATTERY CHARGER(120V)	K	
56			W09-0507-05	BATTERY PACK(PB-6)	KP	
58		*	W09-0527-05	BATTERY CHARGER(240V)	X	
58			W09-0534-05	BATTERY CHARGER(120/230V)	M	
56			W09-0535-05	BATTERY PACK(PB-10)	MTXE	
		*	X52-3170-00	CTCSS UNIT(TSU-7)	KP	
		*	X53-3330-11	CONTROL PC BOARD ASSY	KP	
		*	X53-3330-21	CONTROL PC BOARD ASSY	M	
		*	X53-3330-51	CONTROL PC BOARD ASSY	TE1	
		*	X53-3330-71	CONTROL PC BOARD ASSY	X	
		*	X53-3332-71	CONTROL PC BOARD ASSY	E2	
		*	X57-3630-11	TX-RX PC BOARD ASSY	KP	
		*	X57-3630-21	TX-RX PC BOARD ASSY	MTXE	
CONTROL UNIT (X53-333X-XX) (-11 : K, P; -21 : M; -51 : T, E1; -71 : X; 2-71 : E2)						
A1		*	B38-0338-05	DISPLAY ASSY		
C1			CC73GSL1H101J	CHIP C 100PF J		
C2			CK73EB1H471K	CHIP C 470PF K		
C3			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C4			CK73FB1E104K	CHIP C 0.10UF K		
C5 -15			CK73GB1H471K	CHIP C 470PF K		
C16			C92-0047-05	ELECTRO 47UF 6.3WV		
C17 -22			CK73GB1H471K	CHIP C 470PF K		
C23			C92-0519-05	CHIP-TAN 1UF 25WV		
C25			CE04NW1C101M	ELECTRO 100UF 16WV		
C26 -28			CK73GB1H471K	CHIP C 470PF K		
C29 ,30			CK73GB1H471K	CHIP C 470PF K		
C31			C92-0047-05	ELECTRO 47UF 6.3WV		

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C32			C92-0519-05	CHIP-TAN 1UF 25WV		
C33			CK73GB1H471K	CHIP C 470PF K		
C35 -38			CK73GB1H471K	CHIP C 470PF K		
C39			CK73GB1E103K	CHIP C 0.010UF K		
C40			CK73GB1H471K	CHIP C 470PF K		
C41			CK73GB1E103K	CHIP C 0.010UF K		
C42			C92-0002-05	CHIP-TAN 0.22UF 35WV		
C43			CK73FB1E223K	CHIP C 0.022UF K		
C45			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C46			CK73GB1E103K	CHIP C 0.010UF K		
C47			CK73GB1H471K	CHIP C 470PF K		
C48			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C49			CK73GB1H471K	CHIP C 470PF K		
C50			CC73GCH1H151J	CHIP C 150PF J		
C51			CK73GB1H182K	CHIP C 1800PF K		
C52			CK73GB1E103K	CHIP C 0.010UF K		
C53			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C54			C92-0517-05	CHIP-TAN 2.2UF 4WV		
C55 ,56			CK73GB1H471K	CHIP C 470PF K		
C57			CK73GB1E103K	CHIP C 0.010UF K		
C58			CK73GB1H472K	CHIP C 4700PF K		
C59			CK73GB1H102K	CHIP C 1000PF K		
C60 ,61			CK73GB1H471K	CHIP C 470PF K		
C62			CK73FB1E223K	CHIP C 0.022UF K		
C63			CK73FB1E473K	CHIP C 0.047UF K		
C64			C92-0517-05	CHIP-TAN 2.2UF 4WV		
C65			CK73FB1E473K	CHIP C 0.047UF K		
C66			CK73GB1H471K	CHIP C 470PF K		
C67			CK73FB1E104K	CHIP C 0.10UF K		
C69			CK73FB1E223K	CHIP C 0.022UF K		
C70 ,71			CK73FB1E473K	CHIP C 0.047UF K		
C72			CK73GB1H471K	CHIP C 470PF K		
C73			CK73FB1E104K	CHIP C 0.10UF K		
C74			CK73GB1H471K	CHIP C 470PF K		
C76			CK73FB1E473K	CHIP C 0.047UF K		
C77 -79			CK73GB1H471K	CHIP C 470PF K		
C80			CK73GB1H472K	CHIP C 4700PF K		
C81			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C82			C90-2052-05	ELECTRO 68UF 10WV		
C83			CK73FB1E473K	CHIP C 0.047UF K		
C84			CK73GB1H471K	CHIP C 470PF K		
C85			CK73GB1H822K	CHIP C 8200PF K		
C86			CE04NW1A470M	ELECTRO 47UF 10WV		
C87			CK73GB1H471K	CHIP C 470PF K		
C88			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C89			CE04NW0J470M	ELECTRO 47UF 6.3WV		
C90			C90-2052-05	ELECTRO 68UF 10WV		
C91			CK73FB1E473K	CHIP C 0.047UF K		
C92 ,93			CK73GB1H471K	CHIP C 470PF K		
C95 -97			CK73GB1H471K	CHIP C 470PF K		
C98			C92-0004-05	CHIP-TAN 1.0UF 10WV		
C99 -102			CK73GB1H471K	CHIP C 470PF K		
C103			C90-2050-05	ELECTRO 33UF 6.3WV		
C105,106			CK73GB1H471K	CHIP C 470PF K		
C108			CK73GB1E103K	CHIP C 0.010UF K		

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C109,110 C111 C112,113 C115-117 C120			CK73GB1H471K CK73GB1E103K CC73GCH1H270J CK73GB1E103K CK73GB1H471K	CHIP C 470PF K CHIP C 0.010UF K CHIP C 27PF J CHIP C 0.010UF K CHIP C 470PF K		
C121 C122 C123 C124 C125,126			CK73FB1E104K C92-0004-05 CK73FB1E104K CE04NWOJ221M CK73GB1H471K	CHIP C 0.10UF K CHIP-TAN 1.0UF 10WV CHIP C 0.10UF K ELECTRO 220UF 6.3WV CHIP C 470PF K		
C127 C129-131 C132,133			C90-2049-05 CK73GB1H471K CC73GSL1H221J	ELECTRO 15UF 6.3WV CHIP C 470PF K CHIP C 220PF J		
CN1 ,2 CN3 J1 J2		*	E40-5408-05 E40-5343-05 E11-0420-15 E11-0439-05	PIN CONNECTOR(21P) PIN CONNECTOR(9P) PHONE JACK(3.5D) PHONE JACK		
		*	F20-1048-04	INSULATING BOARD		
		*	J82-0009-15	FPC		
L3 L4 X1 X2		*	L33-0737-05 L92-0131-05 L77-1398-05 L78-0052-05	CHOKO COIL(1nH) BEAS CORE CRYSTAL RESONATOR(3.58MHz) RESONATOR(800KHz)		
CP1 CP2 CP3 CP4 R1		*	R90-0718-05 R90-0720-05 R90-0718-05 R90-0719-05 RK73EB2B101J	MULTI-COMP(4.7Kx4) MULTI-COMP (100Kx4) MULTI-COMP (4.7Kx4) MULTI-COMP (4.7Kx2) CHIP R 100 J 1/8W		
R2 R3 R4 R5 R8			RK73GB1J151J RK73GB1J471J RK73GB1J104J RK73GB1J182J RK73GB1J103J	CHIP R 150 J 1/16W CHIP R 470 J 1/16W CHIP R 100K J 1/16W CHIP R 1.8K J 1/16W CHIP R 10K J 1/16W		
R9 R10 R13 R15 R16			RK73GB1J123J RK73GB1J394J RK73GB1J472J RK73GB1J332J RK73GB1J102J	CHIP R 12K J 1/16W CHIP R 390K J 1/16W CHIP R 4.7K J 1/16W CHIP R 3.3K J 1/16W CHIP R 1.0K J 1/16W		
R17 R18 R19 ,20 R21 R22			RK73GB1J272J RK73GB1J472J RK73GB1J274J RK73GB1J472J RK73GB1J332J	CHIP R 2.7K J 1/16W CHIP R 4.7K J 1/16W CHIP R 270K J 1/16W CHIP R 4.7K J 1/16W CHIP R 3.3K J 1/16W		
R23 R25 R26 R27 R28			RK73GB1J102J RK73GB1J272J RK73GB1J472J RK73GB1J100J RK73GB1J104J	CHIP R 1.0K J 1/16W CHIP R 2.7K J 1/16W CHIP R 4.7K J 1/16W CHIP R 10 J 1/16W CHIP R 100K J 1/16W		
R29 R30 R31 R32 R33			RK73GB1J272J RK73GB1J273J RK73GB1J472J RK73GB1J223J RK73GB1J103J	CHIP R 2.7K J 1/16W CHIP R 27K J 1/16W CHIP R 4.7K J 1/16W CHIP R 22K J 1/16W CHIP R 10K J 1/16W		

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R35			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R36			RK73GB1J391J	CHIP R 390 J 1/16W		
R37			RK73GB1J154J	CHIP R 150K J 1/16W		
R38 ,39			RK73GB1J104J	CHIP R 100K J 1/16W		
R40			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R41 -43			RK73GB1J103J	CHIP R 10K J 1/16W		
R45			RK73GB1J183J	CHIP R 18K J 1/16W		
R46 ,47			RK73GB1J153J	CHIP R 15K J 1/16W		
R48			RK73GB1J104J	CHIP R 100K J 1/16W		
R49			RK73GB1J183J	CHIP R 18K J 1/16W		
R51			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R53			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R55			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R56			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R57			RK73GB1J154J	CHIP R 150K J 1/16W		
R58			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R59			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R60			RK73GB1J331J	CHIP R 330 J 1/16W		
R61			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R62			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R63			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R65			RK73GB1J154J	CHIP R 150K J 1/16W		
R66			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R67			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R68			RK73GB1J331J	CHIP R 330 J 1/16W		
R70			R92-1252-05	CHIP R 0 OHM		
R71			RK73GB1J563J	CHIP R 56K J 1/16W		
R72			RK73GB1J333J	CHIP R 33K J 1/16W		
R73			RK73GB1J153J	CHIP R 15K J 1/16W		
R75			RK73GB1J390J	CHIP R 39 J 1/16W		
R76			RK73GB1J100J	CHIP R 10 J 1/16W		
R77 ,78			RK73GB1J104J	CHIP R 100K J 1/16W		
R79			RK73GB1J153J	CHIP R 15K J 1/16W		
R80			RK73GB1J390J	CHIP R 39 J 1/16W		
R81			RK73GB1J822J	CHIP R 8.2K J 1/16W		
R82			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R83			RK73GB1J100J	CHIP R 10 J 1/16W		
R85			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R86			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R87			RK73GB1J103J	CHIP R 10K J 1/16W		
R88			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R90			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R91			RK73GB1J474J	CHIP R 470K J 1/16W		
R92			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R93			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R94			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R95 ,96			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R101			RK73GB1J100J	CHIP R 10 J 1/16W		
R102			RK73GB1J274J	CHIP R 270K J 1/16W		
R103			RK73GB1J124J	CHIP R 120K J 1/16W		
R104			RK73GB1J223J	CHIP R 22K J 1/16W		
R105			RK73GB1J273J	CHIP R 27K J 1/16W		
R106,107			RK73GB1J223J	CHIP R 22K J 1/16W		
R109			RK73GB1J274J	CHIP R 270K J 1/16W		
R110			RK73GB1J333J	CHIP R 33K J 1/16W		

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R111			RK73GB1J224J	CHIP R 220K J 1/16W		
R112			RK73GB1J473J	CHIP R 47K J 1/16W		
R113			RK73GB1J220J	CHIP R 22 J 1/16W		
R114			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R115			RK73GB1J103J	CHIP R 10K J 1/16W		
R116			RK73FB2A220J	CHIP R 22 J 1/10W		
R117			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R119			RK73GB1J105J	CHIP R 1.0M J 1/16W		
R120			RK73GB1J101J	CHIP R 100 J 1/16W		
R121			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R124			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R127			R92-1252-05	CHIP R 0 OHM	KTE	
R128			R92-1252-05	CHIP R 0 OHM	KTEM	
R129			R92-1252-05	CHIP R 0 OHM	KM	
R130			RK73GB1J100J	CHIP R 10 J 1/16W		
R132, 133			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R134			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R135			RK73FB2A101J	CHIP R 100 J 1/10W		
R137			RD14BB2B102J	RD 1.0K J 1/8W		
VR1 , 2		*	R23-3406-05	POTENTIOMETER		
VR3 -6		*	R12-6717-05	TRIMMING POT(47K)		
S1 , 2		*	S40-1414-05	PUSH SWITCH		
S3		*	S40-1420-05	PUSH SWITCH		
S4		*	S40-1414-05	PUSH SWITCH		
MIC			T91-0502-05	MICROPHONE		
D1		*	S-81250HG	IC(VOLTAGE REGULATOR/ +5V)		
D2 -5		*	DE5SC4M	DIODE		
D6		*	MA110	DIODE		
D7		*	DAN222	DIODE		
		*	DA221	DIODE		
D8 -13			LN01301C(Q)	DIODE		
D14			RLZJ5.6B	DIODE		
IC1			NJM4560M	IC(OP AMP X2)		
IC2 -4			TC4066BF	IC(BILATERAL SWITCH X4)		
ICS , 6			NJM386BM	IC(OP AMP)		
IC7			TC4S66F	IC(BILATERAL SWITCH)		
IC8			S-81250HG-RD	IC(VOLTAGE REGULATOR/ +5V)		
IC9			S-8054ALR-LN	IC		
IC10		*	75116GF-674-3BE	IC(CPU)	MXTE	
IC10		*	75116GF-675-3BE	IC(CPU)	K	
IC11		*	LC7385M	IC		
IC12		*	HD404608A71H	IC(CPU)		
Q1		*	UMA9	TRANSISTOR		
Q2		*	FMA7	TRANSISTOR		
Q3		*	UMA9	TRANSISTOR		
Q4		*	FMA7	TRANSISTOR		
Q5		*	2SB1182F5(Q)	TRANSISTOR		
Q6		*	UMW1	TRANSISTOR		
Q7		*	UMA9	TRANSISTOR		
Q8		*	2SB1182F5(Q)	TRANSISTOR		
Q9		*	UMW1	TRANSISTOR		
Q10		*	DTB113ZK	DIGITAL TRANSISTOR		
Q11		*	DTC144EE	DIGITAL TRANSISTOR		

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Q12 Q13 Q14 ,15 Q16 Q17		*	UMG1 DTC144EU 2SC4116(Y) 2SB1182F5(Q) 2SC4617(R)	TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q18 Q19 Q20 Q21 Q22		*	DTA144WE 2SC4617(R) UMB2 2SB798(DL,DK) DTC144EE	DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR		
Q23 Q24			DTC144EU DTB113ZK	DIGITAL TRANSISTOR DIGITAL TRANSISTOR		
B1 S5			W09-0394-05 W02-0900-15 212-0702-05	LITHIUM BATTERY ENCODER(ENC) PLASTIC TUBE		
TX-RX UNIT (X57-3630-XX) (-11 : K, P; -21 : M, T, X, E)						
C1 C2 C3 C5 C6			C92-0004-05 CK73GB1H102K C92-0507-05 C92-0045-05 CK73GB1H102K	CHIP-TAN 1.0UF 10WV CHIP C 1000PF K CHIP-TAN 4.7UF 6.3WV ELECTRO 22UF 6.3WV CHIP C 1000PF K		
C7 C8 C9 C10 C11			CK73FB1E473K C92-0001-05 C92-0507-05 CK73GB1H102K CK73FB1E473K	CHIP C 0.047UF K CHIP-TAN 0.1UF 35WV CHIP-TAN 4.7UF 6.3WV CHIP C 1000PF K CHIP C 0.047UF K		
C12 ,13 C14 C15 ,16 C17 C18			CK73GB1H102K CC73GCH1H270J CK73GB1H102K CK73GB1E103K CC73GCH1H100D	CHIP C 1000PF K CHIP C 27PF J CHIP C 1000PF K CHIP C 0.010UF K CHIP C 10PF D		
C19 ,20 C21 C22 C23 C24			CK73GB1H102K CK73GB1E103K CC73GCH1H150J CK73GB1H102K CC73GCH1H080D	CHIP C 1000PF K CHIP C 0.010UF K CHIP C 15PF J CHIP C 1000PF K CHIP C 8PF D		
C25 ,26 C27 C28 C29 C30			CK73GB1H102K CK73GB1E103K CK73GB1H102K CK73GB1E103K CE04CW1C4R7M	CHIP C 1000PF K CHIP C 0.010UF K CHIP C 1000PF K CHIP C 0.010UF K ELECTRO 4.7UF 16WV		
C31 C32 C33 C35 C36			CK73GB1H102K CE04NW1C220M CK73GB1H102K CK73GB1H102K CC73GCH1H220J	CHIP C 1000PF K ELECTRO 22UF 16WV CHIP C 1000PF K CHIP C 1000PF K CHIP C 22PF J		
C37 C38 C39 C40 C41 ,42			CC73GCH1H120J CC73GCH1H330J CC73GCH1H030C CC73GCH1H220J CK73GB1H471K	CHIP C 12PF J CHIP C 33PF J CHIP C 3PF C CHIP C 22PF J CHIP C 470PF K		
C43 C45			CK73GB1H102K CK73GB1H102K	CHIP C 1000PF K CHIP C 1000PF K		

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C46			CC73GCH1H080D	CHIP C 8PF D		
C47			CK73GB1E103K	CHIP C 0.010UF K		
C50, 51			CK73GB1H102K	CHIP C 1000PF K		
C52			CK73GB1E103K	CHIP C 0.010UF K		
C53			CC73GCH1H060D	CHIP C 6PF D		
C54			CC73GCH1H120J	CHIP C 12PF J		
C55			CK73GB1E103K	CHIP C 0.010UF K		
C56			CC73GCH1H470J	CHIP C 47PF J		
C57			CC73GCH1H080D	CHIP C 8PF D	M	
C57			CC73GCH1H120J	CHIP C 12PF J	K	
C58			CC73GCH1H1R5C	CHIP C 1.5PF C		
C61			CK73GB1H102K	CHIP C 1000PF K		
C62			CC73GCH1H080D	CHIP C 8PF D	M	
C62			CC73GCH1H120J	CHIP C 12PF J	K	
C63			CK73GB1H102K	CHIP C 1000PF K		
C65			CC73GCH1H060D	CHIP C 6PF D	M	
C65			CC73GCH1H100DMU	CHIP C 10PF D	K	
C66			CC73GCH1H150J	CHIP C 15PF J		
C67			CK73GB1H102K	CHIP C 1000PF K		
C68			CC73GCH1H040C	CHIP C 4PF C		
C69			CC73GCH1H090D	CHIP C 9PF D		
C70			CC73GCH1H040C	CHIP C 4PF C		
C71, 72			CK73GB1H102K	CHIP C 1000PF K		
C73			CK73GB1H471K	CHIP C 470PF K		
C75 -77			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C78			CK73FB1E123K	CHIP C 0.012UF K	M	
C78			CK73FB1E473K	CHIP C 0.047UF K	K	
C79			CK73GB1H102K	CHIP C 1000PF K		
C80			CK73FB1E333K	CHIP C 0.033UF K		
C81			CK73GB1H102K	CHIP C 1000PF K		
C82, 83			CK73GB1H471K	CHIP C 470PF K		
C84			CK73GB1H102K	CHIP C 1000PF K		
C85			C92-0001-05	CHIP-TAN 0.1UF 35WV		
C86, 87			CK73FB1E104K	CHIP C 0.10UF K		
C88			CK73GB1E103K	CHIP C 0.010UF K		
C89			CC73GCH1H270J	CHIP C 27PF J		
C90			CC73GCH1H150J	CHIP C 15PF J		
C91			CK73GB1E103K	CHIP C 0.010UF K		
C92, 93			CK73FB1E104K	CHIP C 0.10UF K		
C94			CC73GCH1H270J	CHIP C 27PF J		
C95			C92-0045-05	ELECTRO 22UF 6.3WV		
C96			CK73GB1H102K	CHIP C 1000PF K		
C97			CC73GCH1H220J	CHIP C 22PF J		
C98			CC73GCH1H070D	CHIP C 7PF D		
C99, 100			CK73GB1H471K	CHIP C 470PF K		
C201		*	C92-0532-05			
C202			CK73GB1E103K	CHIP C 0.010UF K		
C203			CK73GB1H471K	CHIP C 470PF K		
C205			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C206			C92-0045-05	ELECTRO 22UF 6.3WV		
C207			CK73GB1H471K	CHIP C 470PF K		
C208			CK73FB1E473K	CHIP C 0.047UF K		
C209			C92-0001-05	CHIP-TAN 0.1UF 35WV		
C210			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C211			CC73GCH1H270J	CHIP C 27PF J		

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C212			C92-0002-05	CHIP-TAN 0.22UF 35WV		
C213			CK73GB1H471K	CHIP C 470PF K		
C214			CK73GB1E103K	CHIP C 0.010UF K		
C215-218			CK73GB1H471K	CHIP C 470PF K		
C219			CK73GB1E103K	CHIP C 0.010UF K		
C220			CC73GCH1H060D	CHIP C 6PF D		
C221-223			CK73GB1H471K	CHIP C 470PF K		
C224			CK73GB1H471K	CHIP C 470PF K		
C225			CK73GB1H471K	CHIP C 470PF K		
C226			CC73GCH1H050C	CHIP C 5PF C		
C227			CK73GB1E103K	CHIP C 0.010UF K		
C228		*	C92-0037-05	ELECTRO 10UF 16WV		
C229			CK73GB1H471K	CHIP C 470PF K		
C230			C92-0045-05	ELECTRO 22UF 6.3WV		
C231			CK73GB1H471K	CHIP C 470PF K		
C232			CC73GCH1H020C	CHIP C 2.0PF C		
C233			CC73GCH1H080D	CHIP C 8PF D		
C235			CC73GCH1H010C	CHIP C 1PF C		
C236			CC73GCH1H090D	CHIP C 9PF D		
C237			CC73GCH1H1R5C	CHIP C 1.5PF C		
C238			CC73GCH1H040C	CHIP C 4PF C		
C239			CC73GCH1H070D	CHIP C 7PF D		
C240			CC73GCH1H020C	CHIP C 2.0PF C		
C241			CC73GCH1H070D	CHIP C 7PF D		
C242			CC73GCH1H040C	CHIP C 4PF C		
C243			CC73GCH1H070D	CHIP C 7PF D		
C245			CC73GCH1H030C	CHIP C 3PF C		
C246			CC73GCH1H010C	CHIP C 1PF C		
C247, 248			CC73GCH1H040C	CHIP C 4PF C		
C249			CK73GB1H471K	CHIP C 470PF K	K	
C250			CC73GCH1H120J	CHIP C 12PF J		
C251			CK73GB1E103K	CHIP C 0.010UF K		
C252			CK73GB1H471K	CHIP C 470PF K		
C253			CC73GCH1H030C	CHIP C 3PF C	M	
C253			CC73GCH1H040C	CHIP C 4PF C	K	
C255			CC73GCH1H020C	CHIP C 2.0PF C		
C256			CK73GB1H102K	CHIP C 1000PF K		
C257			CC73GCH1H180J	CHIP C 18PF J		
C258			CK73GB1E103K	CHIP C 0.010UF K		
C259			CC73GCH1H120J	CHIP C 12PF J		
C260			CC73GCH1H050C	CHIP C 5PF C		
C261			CC73GCH1H101J	CHIP C 100PF J		
C262			CK73GB1E103K	CHIP C 0.010UF K		
C263			CK73GB1H471K	CHIP C 470PF K		
C264			CC73GCH1H120J	CHIP C 12PF J		
C265			CK73GB1H471K	CHIP C 470PF K		
C266			CC73GCH1H080D	CHIP C 8PF D		
C267			CK73GB1H471K	CHIP C 470PF K		
C268			CC73GCH1H060D	CHIP C 6PF D		
C269			CC73GCH1H030C	CHIP C 3PF C		
C270, 271			CK73GB1H471K	CHIP C 470PF K		
C272			CC73GCH1H060D	CHIP C 6PF D		
C273			CK73GB1H471K	CHIP C 470PF K		
C274			CK73GB1H471K	CHIP C 470PF K		
C275			CK73GB1H471K	CHIP C 470PF K	K	

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C277			CC73GCH1H050C	CHIP C 5PF C		
C278			CC73GCH1H150J	CHIP C 15PF J		
C279			CC73GCH1H060D	CHIP C 6PF D		
C281			CC73GCH1H030C	CHIP C 3PF C	K	
C282			CC73GCH1H1R5C	CHIP C 1.5PF C	K	
C283			CC73GCH1H010C	CHIP C 1PF C	K	
C284			CK73GB1H471K	CHIP C 470PF K	K	
C285, 286			CK73GB1H471K	CHIP C 470PF K		
C287		*	CC73GCH1H181J	CHIP C 180PF J		
C288			CC73GCH1H150J	CHIP C 15PF J		
C289, 290			CK73GB1E103K	CHIP C 0.010UF K		
C291			CC73GCH1H390J	CHIP C 39PF J		
C292, 293			CK73GB1H102K	CHIP C 1000PF K	K	
C294			CK73GB1H471K	CHIP C 470PF K		
C295			CK73GB1E103K	CHIP C 0.010UF K		
C296			CK73GB1H102K	CHIP C 1000PF K		
C297			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		
C298			CK73GB1E103K	CHIP C 0.010UF K		
C299			CK73GB1H471K	CHIP C 470PF K		
C300			C92-0001-05	CHIP-TAN 0.1UF 35WV		
C301			CK73GB1H102K	CHIP C 1000PF K		
C302			CK73GB1H471K	CHIP C 470PF K		
C303			CC73GCH1H220J	CHIP C 220PF J		
C305			CC73GCH1H220J	CHIP C 220PF J		
C306			CK73GB1E103K	CHIP C 0.010UF K		
C307, 308			CK73FB1E104K	CHIP C 0.10UF K		
C309			CC73GCH1H270J	CHIP C 27PF J		
C310, 311			CK73FB1E104K	CHIP C 0.10UF K	K	
C312			CK73GB1H471K	CHIP C 470PF K		
C313			CC73GCH1H080D	CHIP C 8PF D		
C314, 315			CK73GB1H102K	CHIP C 1000PF K		
C316, 317			CK73GB1H471K	CHIP C 470PF K		
C318			CK73GB1H102K	CHIP C 1000PF K		
TC201		*	C05-0373-05	TRIMMING CAP		
A200	2B	*	E29-0498-04	GRAND TERMINAL(UHF)		
A201	3B	*	E29-0487-04	CONNECTOR, TERMINAL		
A202	3B	*	E29-0486-04	CONNECTOR, TERMINAL		
CN1		*	E29-0493-04	CONNECTOR, TERMINAL		
		*	E40-5425-05	PIN CONNECTOR		
CN2			E40-3484-05	PIN CONNECTOR		
CN201		*	E40-5425-05	PIN CONNECTOR		
CN202		*	E40-5447-05	PIN CONNECTOR		
J201			E03-0170-05	AC OUTLET		
J202			E23-0603-05	TERMINAL		
TP1 , 2			E23-0342-05	TERMINAL		
		*	F20-1067-04	GRAND TERMINAL(MQUDAL)		
A2		*	F10-1453-04	SHIELDING PLATE		
			J30-0545-05	SPACER		
W1		*	J82-0007-05	FPC		
W201		*	J82-0008-05	FPC		
CD1			L79-1013-05	FILTER		
CD201			L79-1013-05	FILTER		
CF1			L72-0362-05	CERAMIC FILTER		

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CF201			L72-0362-05	CERAMIC FILTER		
L1			L40-1091-17	SMALL FIXED INDUCTOR(1u)		
L2		*	L92-0131-05	BEAS CORE		
L3			L40-1081-80	SMALL FIXED INDUCTOR(100n)		
L5			L40-1281-80	SMALL FIXED INDUCTOR(120n)		
L6		*	L92-0132-05	BEAS CORE		
L7			L40-1092-81	SMALL FIXED INDUCTOR(1u)		
L8		*	L34-1328-05	COIL(9T)		
L9			L40-1092-19	SMALL FIXED INDUCTOR(1u)		
L10		*	L34-1334-05	COIL(5T)		
L11		*	L34-1327-05	COIL(7.5T)		
L12			L33-0680-05	CHOKE COIL		
L13		*	L92-0131-05	BEAS CORE		
L15		*	L40-8285-48	SMALL FIXED INDUCTOR(0.82u)		
L17		*	L34-4246-05	COIL(3' rd)		
L18		*	L34-4245-05	COIL(2' nd)		
L19		*	L34-4244-05	COIL(1' st)		
L20			L40-1072-80	SMALL FIXED INDUCTOR(10n)		
L21 -23		*	L92-0131-05	BEAS CARE		
L25		*	L92-0131-05	BEAS CORE		
L26			L40-1092-19	SMALL FIXED INDUCTOR(1u)		
L27			L40-1091-17	SMALL FIXED INDUCTOR(1u)		
L28		*	L92-0131-05	BEAS CORE		
L29			L40-1092-81	SMALL FIXED INDUCTOR(1u)		
L201		*	L92-0131-05	BEAS CORE		
L202			L40-2272-80	SMALL FIXED INDUCTOR(22n)		
L203			L40-1872-80	SMALL FIXED INDUCTOR(18n)		
L204		*	L92-0131-05	BEAS CORE		
L205			L40-1872-80	SMALL FIXED INDUCTOR(18n)		
L206			L40-1092-81	SMALL FIXED INDUCTOR(1u)		
L207			L34-1263-05	COIL(3.5T)		
L208, 209			L34-1264-05	COIL(2.5T)		
L210			L34-1263-05	COIL(3.5T)		
L211, 212			L34-1264-05	COIL(2.5T)		
L213		*	L34-1326-05	COIL(5.5T)		
L214		*	L92-0131-05	BEAS CORE		
L215, 216			L34-1264-05	COIL(2.5T)		
L217, 218		*	L92-0131-05	BEAS CORE		
L219		*	L40-4785-48	SMALL FIXED INDUCTOR(0.47u)		
L220		*	L40-6885-48	SMALL FIXED INDUCTOR(0.68u)		
L221			L40-2272-48	SMALL FIXED INDUCTOR(22n)		
L222, 223			L40-1872-80	SMALL FIXED INDUCTOR(18n)		
L224			L40-2272-80	SMALL FIXED INDUCTOR(22n)		
L225			L40-1072-80	SMALL FIXED INDUCTOR(10n)		
L226		*	L79-1011-05	FILTER	M	
L226		*	L79-1012-05	FILTER	K	
L227, 228			L40-1872-80	SMALL FIXED INDUCTOR(18n)		
L229			L40-1092-81	SMALL FIXED INDUCTOR(1u)		
L230			L40-1872-80	SMALL FIXED INDUCTOR(18n)		
L231			L40-2272-80	SMALL FIXED INDUCTOR(22n)		
L232			L34-1325-05	COIL (3.0TS)	k	
L233		*	L92-0131-05	BEAS CORE		
L235		*	L40-3982-81	SMALL FIXED INDUCTOR(0.39u)		
X1		*	L77-1438-05	CRYSTAL RESONATOR(45.505KHz)		
X201		*	L77-1440-05	CRYSTAL RESONATOR(12.8MHz)		

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X202		*	L77-1439-05	CRYSTAL RESONATOR(58.07MHz)		
XF1		*	L71-0409-05	CRYSTAL FILTER		
XF201		*	L71-0410-05	CRYSTAL FILTER		
CP1		*	RK73FB2A473J	CHIP R 47K J 1/10W		
CP201		*	R90-0718-05	MULTI-COMP		
R1 ,2		*	R90-0718-05	MULTI-COMP		
R3			RK73GB1J563J	CHIP R 56K J 1/16W		
			R92-1252-05	CHIP R 0 OHM		
R5			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R7			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R8			RK73GB1J103J	CHIP R 10K J 1/16W		
R9			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R10 ,11			RK73GB1J272J	CHIP R 2.7K J 1/16W		
R12			RK73GB1J270J	CHIP R 27 J 1/16W		
R13			RK73GB1J821J	CHIP R 820 J 1/16W		
R15			RK73GB1J823J	CHIP R 82K J 1/16W		
R16			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R17			RK73GB1J562J	CHIP R 5.6K J 1/16W		
R18			RK73GB1J390J	CHIP R 39 J 1/16W		
R19			RK73GB1J181J	CHIP R 180 J 1/16W		
R20			RK73GB1J471J	CHIP R 470 J 1/16W		
R21			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R22			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R23			RK73GB1J680J	CHIP R 68 J 1/16W		
R25			RK73GB1J220J	CHIP R 22 J 1/16W		
R26			RK73GB1J271J	CHIP R 270 J 1/16W		
R27 ,28			RK73GB1J101J	CHIP R 100 J 1/16W		
R29			RK73GB1J271J	CHIP R 270 J 1/16W		
R30 ,31			RK73FB2A101J	CHIP R 100 J 1/10W		
R33			RK73GB1J470J	CHIP R 47 J 1/16W		
R35			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R36			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R37			RK73GB1J103J	CHIP R 10K J 1/16W		
R38			RK73GB1J334J	CHIP R 330K J 1/16W		
R39			RK73GB1J561J	CHIP R 560 J 1/16W		
R40			RK73GB1J471J	CHIP R 470 J 1/16W		
R41			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R42			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R43			RK73GB1J103J	CHIP R 10K J 1/16W		
R44			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R45			RK73GB1J470J	CHIP R 47 J 1/16W		
R46			RK73GB1J104J	CHIP R 100K J 1/16W		
R47			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R48			RK73GB1J121J	CHIP R 120 J 1/16W		
R49			R92-1252-05	CHIP R 0 OHM		
R50			RK73GB1J104J	CHIP R 100K J 1/16W		
R51			RK73GB1J101J	CHIP R 100 J 1/16W		
R52			RK73GB1J104J	CHIP R 100K J 1/16W		
R53			RK73GB1J180J	CHIP R 18 J 1/16W		
R54			R92-1252-05	CHIP R 0 OHM		
R55			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R56			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R57			RK73GB1J471J	CHIP R 470 J 1/16W		
R58			RK73GB1J472J	CHIP R 4.7K J 1/16W		

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R59			RK73GB1J393J	CHIP R 39K J 1/16W		
R61			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R62			RK73GB1J101J	CHIP R 100 J 1/16W		
R63			RK73GB1J103J	CHIP R 10K J 1/16W		
R64			RK73GB1J123J	CHIP R 12K J 1/16W		
R65			RK73GB1J332J	CHIP R 3.3K J 1/16W		
R66			RK73GB1J561J	CHIP R 560 J 1/16W		
R67			RK73GB1J104J	CHIP R 100K J 1/16W	M	
R67			RK73GB1J154J	CHIP R 150K J 1/16W	K	
R68			RK73GB1J274J	CHIP R 270K J 1/16W		
R69			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R70			RK73GB1J332J	CHIP R 3.3K J 1/16W		
R71			RK73GB1J681J	CHIP R 681 J 1/16W	K	
R72			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R73			RK73GB1J182J	CHIP R 1.8K J 1/16W	K	
R74			RK73GB1J152J	CHIP R 1.5K J 1/16W	K	
R75			RK73GB1J103J	CHIP R 10K J 1/16W		
R76			RK73GB1J182J	CHIP R 1.8K J 1/16W		
R78 ,79			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R80 -82			R92-1252-05	CHIP R 0 0HM	K	
R201			RK73GB1J123J	CHIP R 12K J 1/16W		
R202			RK73GB1J563J	CHIP R 56K J 1/16W		
R203			RK73GB1J182J	CHIP R 1.8K J 1/16W		
R206			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R207			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R208			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R209, 210			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R211			R92-1252-05	CHIP R 0 0HM	K	
R212			RK73GB1J821J	CHIP R 820 J 1/16W		
R213			RK73GB1J153J	CHIP R 15K J 1/16W		
R215			RK73GB1J103J	CHIP R 10K J 1/16W		
R216			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R217			RK73GB1J221J	CHIP R 220 J 1/16W		
R218			RK73GB1J182J	CHIP R 1.8K J 1/16W		
R219			RK73GB1J101J	CHIP R 100 J 1/16W		
R220			RK73GB1J220J	CHIP R 22 J 1/16W		
R222			RK73GB1J391J	CHIP R 390 J 1/16W		
R223			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R224, 225			RK73GB1J221J	CHIP R 220 J 1/16W		
R226			RK73GB1J103J	CHIP R 10K J 1/16W		
R227			RK73GB1J220J	CHIP R 22 J 1/16W		
R228			RK73GB1J391J	CHIP R 390 J 1/16W		
R229			RK73GB1J180J	CHIP R 18 J 1/16W		
R230, 231			RK73GB1J101J	CHIP R 100 J 1/16W		
R232, 233			RK73FB2A101J	CHIP R 100 J 1/10W		
R235			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R236			RK73GB1J330J	CHIP R 33 J 1/16W		
R237			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R238			RK73GB1J150J	CHIP R 15 J 1/16W		
R239			RK73GB1J681J	CHIP R 681 J 1/16W		
R240			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R241, 242			RK73GB1J472J	CHIP R 4.7K J 1/16W	K	
R243			RK73GB1J151J	CHIP R 150 J 1/16W		
R245			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R246			RK73GB1J334J	CHIP R 330K J 1/16W		

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R247			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R248			RK73GB1J180J	CHIP R 18 J 1/16W		
R249			RK73GB1J471J	CHIP R 470 J 1/16W		
R250			RK73GB1J333J	CHIP R 33K J 1/16W		
R251			RK73GB1J123J	CHIP R 12K J 1/16W		
R252			RK73GB1J220J	CHIP R 22 J 1/16W		
R253			RK73GB1J101J	CHIP R 100 J 1/16W		
R254			RD14B82B472J	RD 4.7K J 1/8W		
R255			RK73GB1J180J	CHIP R 18 J 1/16W		
R256			RK73GB1J271J	CHIP R 270 J 1/16W		
R257			RK73GB1J223J	CHIP R 22K J 1/16W		
R258			RK73GB1J123J	CHIP R 12K J 1/16W		
R260			R92-1252-05	CHIP R 0 OHM	K	
R261			RK73GB1J103J	CHIP R 10K J 1/16W		
R262			RK73GB1J153J	CHIP R 15K J 1/16W		
R263			RK73GB1J102J	CHIP R 1.0K J 1/16W		
R265			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R266			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R268			RK73GB1J224J	CHIP R 220K J 1/16W		
R270			RK73GB1J471J	CHIP R 470 J 1/16W		
R271			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R272			RK73GB1J104J	CHIP R 100K J 1/16W		
R273			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R275			RK73GB1J332J	CHIP R 3.3K J 1/16W		
R276			RK73GB1J681J	CHIP R 681 J 1/16W		
R277			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R278			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R279			RK73GB1J182J	CHIP R 1.8K J 1/16W		
R281			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R282, 283			R92-1252-05	CHIP R 0 OHM		
VR1		*	R12-6717-05	TRIMMING POT.		
D1			MA110	DIODE		
D2			MA77	DIODE		
D3			1SV172	DIODE		
D4			M1808	DIODE		
D5			MA77	DIODE		
D6		*	RD22P	DIODE		
D8			1SS312	DIODE		
D9			MA728	DIODE	K	
D10 -12			MA360	DIODE		
D13			MA77	DIODE		
D15			MA110	DIODE		
D16			HSM88AS	DIODE		
D201			MA110	DIODE		
D202			MA77	DIODE		
D203			DA204U	DIODE		
D204, 205			M1808	DIODE		
D206			MA77	DIODE		
D207			MA77	DIODE	K	
D209			MA110	DIODE		
D210			MA77	DIODE		
D212			1SS300	DIODE		
D213			HSM88AS	DIODE		
D214			MA77	DIODE		

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D216 IC1 IC2 IC3 IC201			MA77 * M56760FP * MC3372D * S-AV22A * M56760FP	DIODE IC IC POWER MODULE(VHF) IC		
IC202 Q1 Q2 ,3 Q4 Q5			* MC3372D 2SC4117(BL) 2SC4215(Y) 2SC3356 * 2SC4619	IC TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q6 Q7 Q8 Q9 Q10			2SC4083(N,P) 2SK360(E) * DTA143EE * DTA144EE * DTA143EE	TRANSISTOR FET DIGITAL TRANSISTOR DIGITAL TRANSISTOR DIGITAL TRANSISTOR		
Q11 Q12 Q13 Q201 Q202			DTC114YE * UMG2 * 2SC4617(R) 2SC4117(BL) 2SC4226(R24)	DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q203 Q204 Q205-207 Q208 Q209			2SC4226(R23,24) 2SC4093(R26,27) 2SC4226(R24) FMA1 DTA143EU	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR	K K	
Q210 Q211,212			2SC4215(Y) 2SC4116(Y) * X58-3740-00 * X58-3760-00 * X58-3770-00(A) * X58-3770-00(B) * X58-3770-00(C) * X58-3770-00(D) * X59-3810-00(A) * X59-3810-00(B)	TRANSISTOR TRANSISTOR VCO UNIT(VHF) VCO UNIT(UHF) APC UNIT PA UNIT SUB-U UNIT NA UNIT 800 UNIT AM UNIT	 K K	
			212-0702-05	PLASTIC TUBE		
VCO (VHF) UNIT (X58-3740-00)						
C1 C2 C3 C4 C5			CC73GUJ1H010C CK73GB1H102K CC73GCH1H050C CC73GCH1H030C CC73GCH1H010C	CERAMIC CAPACITOR(1PF)C CHIP C 1000PF K CHIP C 5PF C CHIP C 3PF C CHIP C 1PF C		
C7 C8 ,9 C10 -12 C13			CK73GB1H102K CC73GCH1H100D CK73GB1H102K CK73FB1E223K E23-0486-05 * F10-1452-04	CHIP C 1000PF K CHIP C 10PF D CHIP C 1000PF K CHIP C 0.022UF K TERMINAL SHIELDING PLATE		
L1 L2 L3 L4			* L40-1092-19 * L34-1333-05 * L34-1331-05 L40-1092-48	SMALL FIXED INDUCTOR(1u) COIL (8.5T) COIL (5.5T) SMALL FIXED INDUCTOR(1u)		

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R1			RK73GB1J104J	CHIP R 100K J 1/16W		
R3			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R4			RK73GB1J561J	CHIP R 560 J 1/16W		
R5			RK73GB1J151J	CHIP R 150 J 1/16W		
R6			RK73GB1J470J	CHIP R 47 J 1/16W		
R7			RK73GB1J823J	CHIP R 82K J 1/16W		
R8			RK73GB1J821J	CHIP R 820 J 1/16W		
R9			RK73GB1J823J	CHIP R 82K J 1/16W		
R10			RK73GB1J821J	CHIP R 820 J 1/16W		
D1 ,2			MA333	DIODE		
D3			MA360	DIODE		
D4			MA77	DIODE		
Q1			DTC144EU	DIGITAL TRANSISTOR		
Q2			2SK238(K17)	FET		
Q3 ,4			2SC4083(N,P)	TRANSISTOR		
VCO (UHF) UNIT (X58-3760-00)						
C1			CC73GCH1H101J	CHIP C 100PF J		
C2			CC73GCH1H010C	CHIP C 1PF C		
C3			CK73GB1H471K	CHIP C 470PF K		
C4			CK73FB1E104K	CHIP C 0.10UF K		
C5			CK73GB1H471K	CHIP C 470PF K		
C7 ,8			CK73GB1H471K	CHIP C 470PF K		
C9			CK73FB1H103K	CHIP C 0.010UF K		
C10		*	CC73GUJ1H0R5C	CERAMIC CAPACITOR		
C11			CC73GCH1H060D	CHIP C 6PF D		
C12			CK73GB1H471K	CHIP C 470PF K		
C13			CC73GCH1H040C	CHIP C 4PF C		
C14			CC73GCH1H0R5C	CHIP C 0.5PF C		
C15			CC73GCH1H050C	CHIP C 5PF C		
C16			CC73GCH1H101J	CHIP C 100PF J		
C17			CC73GCH1H050C	CHIP C 5PF C		
			E23-0486-05	TERMINAL		
			F10-1451-04	SHIELDING PLATE		
L1			L40-1092-19	SMALL FIXED INDUCTOR(1u)		
L2		*	L34-1335-05	COIL(3.5T)		
L3			L40-3382-19	SMALL FIXED INDUCTOR(0.33u)		
L4		*	L34-1332-05	COIL(4.5T)		
L5		*	L92-0131-05	BEAS CORE		
L6			L40-2281-80	SMALL FIXED INDUCTOR(220n)		
L7			L40-1092-48	SMALL FIXED INDUCTOR(1u)		
R1			RK73GB1J562J	CHIP R 5.6K J 1/16W		
R2			RK73GB1J220J	CHIP R 22 J 1/16W		
R3			RK73GB1J470J	CHIP R 47 J 1/16W		
R4			RK73GB1J333J	CHIP R 33K J 1/16W		
R5			RK73GB1J123J	CHIP R 12K J 1/16W		
R6			RK73GB1J471J	CHIP R 470 J 1/16W		
R7			RK73GB1J561J	CHIP R 560 J 1/16W		
R8			RK73GB1J333J	CHIP R 33K J 1/16W		
R9			RK73GB1J123J	CHIP R 12K J 1/16W		
R10			RK73GB1J104J	CHIP R 100K J 1/16W		
D1 ,2			MA360	DIODE		
D3			MA77	DIODE		

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D4 Q1 Q2 Q3 , 4		*	MA360 DTC144EE 2SK508NV(K52) 2SC4226(R24, 25)	DIODE DIGITAL TRANSISTOR FET TRANSISTOR		
APC, PA, SUB-U NOISE UNIT (X58-3770-00)						
C1 C2 C3 C4 -12 C101-103			CK73GB1H471K C92-0002-05 CC73GCH1H151J CK73GB1H471K CK73GB1H471K	CHIP C CHIP-TAN CHIP C CHIP C CHIP C	470PF 0.22UF 150PF 470PF 470PF	K 35WV J K K
C104 C105 C106 C107 C108			CK73GB1E103K CK73GB1H471K CK73GB1E103K CK73GB1H471K CK73GB1E103K	CHIP C CHIP C CHIP C CHIP C CHIP C	0.010UF 470PF 0.010UF 470PF 0.010UF	K K K K K
C109 C110 C201 C202 C203, 204			CK73GB1H471K CC73GCH1H020C CC73GCH1H220J CC73GCH1H150J CC73GCH1H101J	CHIP C CHIP C CHIP C CHIP C CHIP C	470PF 2.0PF 22PF 15PF 100PF	K C J J J
C205, 206 C207 C208 C209 C210			CC73GCH1H0R5C CC73GCH1H101J CC73GCH1H180J CC73GCH1H080D CC73GCH1H120J	CHIP C CHIP C CHIP C CHIP C CHIP C	0.5PF 100PF 18PF 8PF 12PF	C J J D J
C211 C212 C213-215 C216 C217			CK73GB1H471K CC73GCH1H020C CC73GCH1H060D CK73GB1H471K CK73GB1E103K	CHIP C CHIP C CHIP C CHIP C CHIP C	470PF 2.0PF 6PF 470PF 0.010UF	K C D K K
C218 C301, 302 C303 C304 C305			CK73GB1H471K CK73GB1H102K CK73GB1H333K C90-2049-05 CK73FB1E223K	CHIP C CHIP C CHIP C ELECTRO CHIP C	470PF 1000PF 0.033UF 15UF 0.022UF	K K K 6.3WV K
C306, 307 TC201, 202			C92-0005-05 C05-0371-05	CHIP-TAN TRIM CAP	2.2UF 10PF	6.3WV
L101 L102 L103 L201 L202 L203			L92-0127-05 L33-0680-05 L34-1266-05 L40-5682-19 L40-3372-80 L40-1072-80	BEAS CORE CHOKER COIL COIL (1.5T) SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR		
R1 R2 R3 R4 , 5 R6			RK73GB1J102J RK73GB1J564J RK73GB1J222J R92-1218-05 R92-1252-05	CHIP R CHIP R CHIP R CHIP R CHIP R	1.0K 560K 2.2K 0.1 0 OHM	J 1/16W J 1/16W J 1/16W J 1/2W
R7 R8 , 9 R10 R11 R12			RK73GB1J102J RK73GB1J223J R92-1252-05 RK73GB1J121G RK73GB1J392J	CHIP R CHIP R CHIP R CHIP R CHIP R	1.0K 22K 0 OHM 120 3.9K	J 1/16W J 1/16W G 1/16W J 1/16W

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R13 ,14 R15 R16 ,17 R18 R19		*	RK73GB1J124J R92-1252-05 RK73GB1J124J R92-1252-05 RK73GB1J101G	CHIP R 120K J 1/16W CHIP R 0 OHM CHIP R 120K J 1/16W CHIP R 0 OHM CHIP R 100 G 1/16W		
R20 R101,102 R201 R202 R203			RK73GB1J392J RK73GB1J271J RK73GB1J273J RK73GB1J220J RK73GB1J123J	CHIP R 3.9K J 1/16W CHIP R 270 J 1/16W CHIP R 27K J 1/16W CHIP R 22 J 1/16W CHIP R 12K J 1/16W		
R204 R205 R206 R207 R301			RK73GB1J471J RK73GB1J392J RK73GB1J471J RK73GB1J103J RK73GB1J274J	CHIP R 470 J 1/16W CHIP R 3.9K J 1/16W CHIP R 470 J 1/16W CHIP R 10K J 1/16W CHIP R 270K J 1/16W		
R302 R303 R304 R305 R306			RK73GB1J561J RK73GB1J332J RK73GB1J123J RK73GB1J103J RK73GB1J101J	CHIP R 560 J 1/16W CHIP R 3.3K J 1/16W CHIP R 12K J 1/16W CHIP R 10K J 1/16W CHIP R 100 J 1/16W		
R307 VR1 VR2 VR3 VR4		*	RK73GB1J152J R12-6545-05 R12-6543-05 R12-6545-05 R12-6543-05	CHIP R 1.5K J 1/16W TRIMMING POT 470 TRIMMING POT 220 TRIMMING POT 470 TRIMMING POT 220		
D1 D2 ,3 D101 D201 D301		*	MA8039 DAN222 1SV172 HSM88AS HSM88AS	DIODE DIODE DIODE DIODE DIODE		
IC1 IC101 Q1 Q2 ,3 Q4			LM301AD S-AU26 2SK879(Y) FMC4 UMG2	IC(OP AMP) POWER MODULE(UHF) FET TRANSISTOR TRANSISTOR		
Q5 -8 Q201 Q202 Q301 Q302 Q303		*	FMC4 2SC4226(R24) 2SC4083(N,P) 2SC4116(Y) UMG1 DTC114YE	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR		
800, AM UNIT (X59-3810-00) : K, P						
C1 C2 ,3 C4 C5 C6			CC73GCH1H050C CC73GCH1H101J CC73GCH1H030C CC73GCH1H020C CC73GCH1H090D	CHIP C 5PF C CHIP C 100PF J CHIP C 3PF C CHIP C 2.0PF C CHIP C 9PF D		
C7 C8 C9 C10 C11			CC73GCH1H1R5C CC73GCH1H150J CK73GB1H102K CC73GCH1H390J CC73GCH1H040C	CHIP C 1.5PF C CHIP C 15PF J CHIP C 1000PF K CHIP C 39PF J CHIP C 4PF C		
C12 C101			CC73GCH1H101J CC73GCH1H101J	CHIP C 100PF J CHIP C 100PF J		

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C102 C103 C104 C105 C106			CK73FB1E223K CK73FB1E333K C92-0507-05 C92-0004-05 CK73GB1E103K	CHIP C 0.022UF K CHIP C 0.033UF K CHIP-TAN 4.7UF 6.3WV CHIP-TAN 1.0UF 10WV CHIP C 0.010UF K		
C107,108 C109 C110			CK73FB1E104K C92-0509-05 CK73GB1E103K	CHIP C 0.10UF K TANTAL 10UF 6.3WV CHIP C 0.010UF K		
L1 L2			L40-1881-80 L40-1072-80	SMALL FIXED INDUCTOR(180n) SMALL FIXED INDUCTOR(10n)		
R1 R4 R5 R6 R7			R92-1252-05 RK73GB1J391J RK73GB1J393J RK73GB1J153J RK73GB1J391J	CHIP R 0 OHM CHIP R 390 J 1/16W CHIP R 39K J 1/16W CHIP R 15K J 1/16W CHIP R 390 J 1/16W		
R8 ,9 R10 R101 R102 R103			RK73GB1J472J RK73GB1J681J RK73GB1J102J R92-1252-05 RK73GB1J274J	CHIP R 4.7K J 1/16W CHIP R 681 J 1/16W CHIP R 1.0K J 1/16W CHIP R 0 OHM CHIP R 270K J 1/16W		
R104 R105 R106			RK73GB1J102J RK73GB1J391J R92-1252-05	CHIP R 1.0K J 1/16W CHIP R 390 J 1/16W CHIP R 0 OHM		
D1 IC101 Q1 Q2 Q3			HSM88AS TA7787AF * 2SC4226(R24, 25) * 2SC4083(N, P) * 2SC4226(R24, 25)	CHIP DIODE IC(FM/AM IF/3V) TRANSISTOR TRANSISTOR TRANSISTOR		
Q101 Q102 Q103		*	2SC4617(R) 2SC4116(Y) DTC144EU	TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR		

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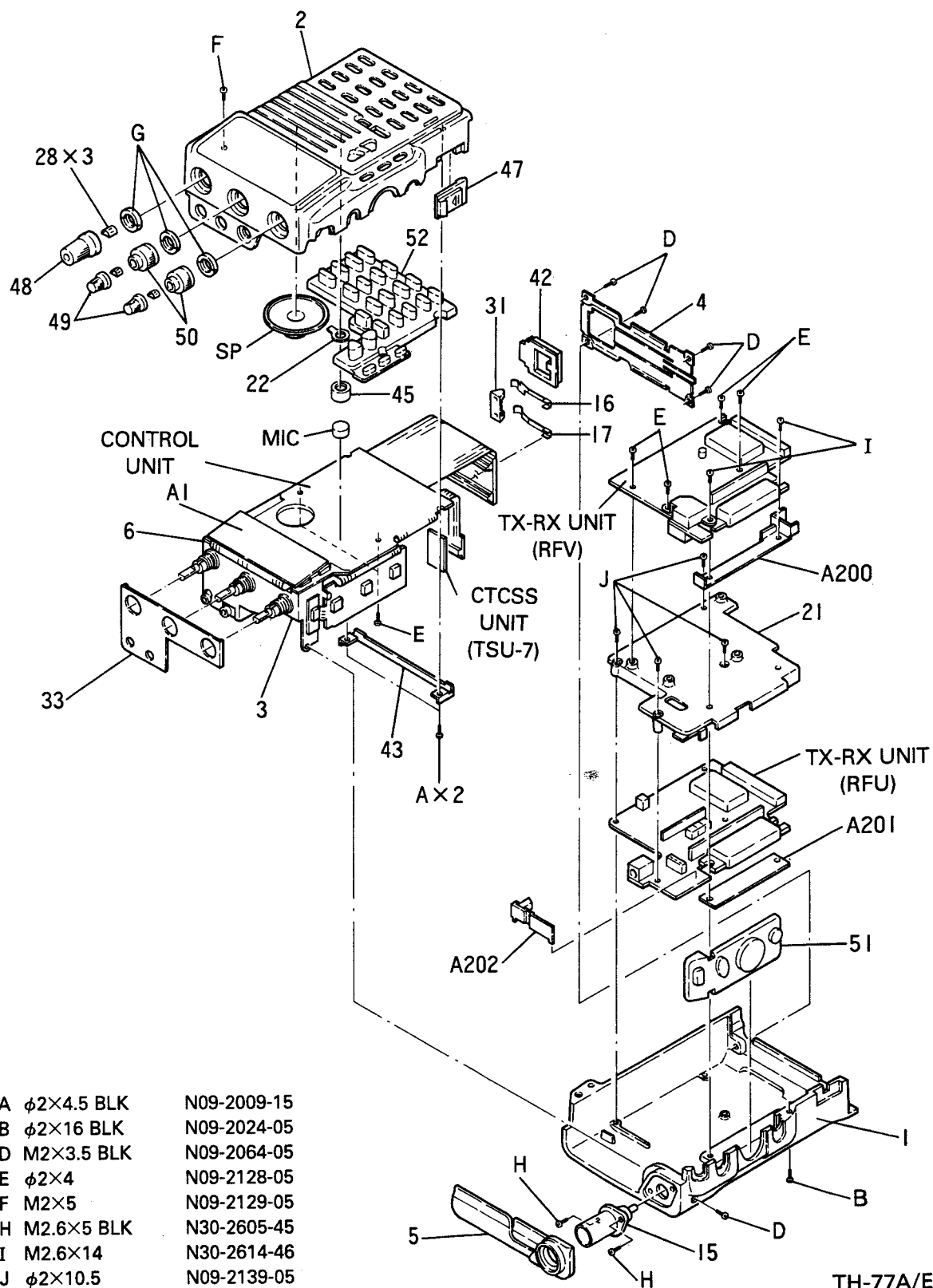
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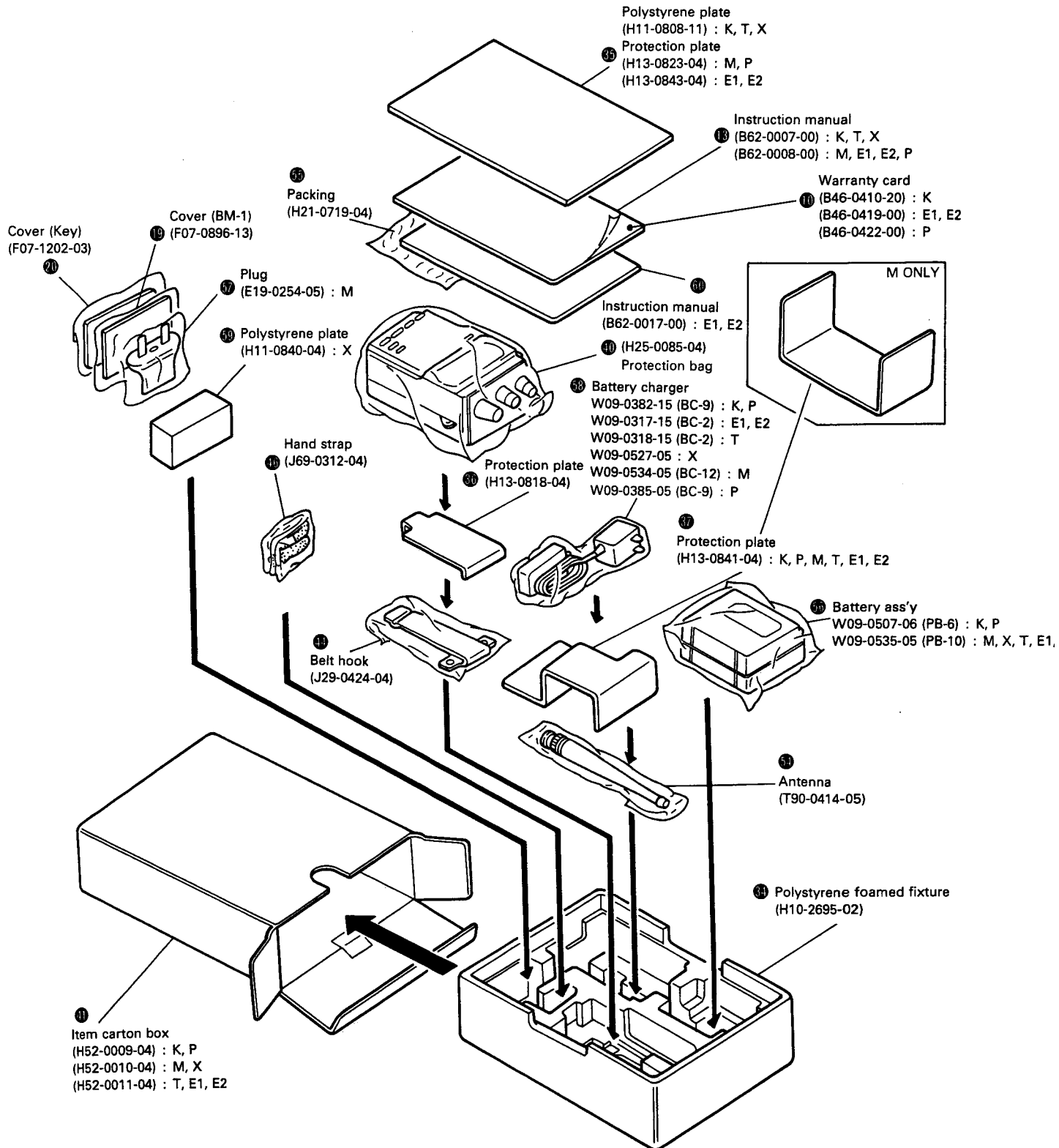
DISASSEMBLY



A	φ2×4.5 BLK	N09-2009-15
B	φ2×16 BLK	N09-2024-05
D	M2×3.5 BLK	N09-2064-05
E	φ2×4	N09-2128-05
F	M2×5	N09-2129-05
H	M2.6×5 BLK	N30-2605-45
I	M2.6×14	N30-2614-46
J	φ2×10.5	N09-2139-05

TH-77A/E

PACKING



ADJUSTMENT

Required test equipment

1. Stabilized Power Supply

- 1) The supply voltage can be changed between 5V and 18V, and the current is 3A or more.
- 2) The standard voltage is 13.8V.

2. DC Ammeter

- 1) Class 1 ammeter (17 ranges and other features).
- 2) The full scale can be set to either 300mA or 3A.
- 3) A cable of less internal loss must be used.

3. Frequency Counter (f. counter)

- 1) Frequencies of up to 1GHz or so can be measured.
- 2) The sensitivity can be changed to 250MHz or below, and measurements are highly stable and accurate (0.2ppm or so).

4. Power Meter

- 1) Measurable frequency : Up to 500MHz.
- 2) Impedance : 50Ω , unbalanced.
- 3) Measuring range : Full scale of 10W or so.
- 4) A standard cable (5D2W 1m) must be used.

5. RF VTVM (RF V.M)

- 1) Measurable frequency : Up to 500MHz or so.

6. Linear Detector

- 1) Measurable frequency : Up to 500MHz.
- 2) Characteristics are flat, and CN is 60dB or more.

7. Digital Voltmeter

- 1) Voltage range : FS = 18V or so.
- 2) Input resistance : $1M\Omega$ or more.

8. Oscilloscope

- 1) Measuring range : DC to 30MHz.
- 2) Provides highly accurate measurements for 5 to 25MHz.

9. AF Voltmeter (AF V.M)

- 1) Measurable frequency : 50Hz to 1MHz.
- 2) Maximum sensitivity : 1mV or more.

10. Spectrum Analyzer

- 1) Measuring range : DC to 1GHz or more.

11. Standard Signal Generator (SSG)

- 1) Maximum frequency : 500MHz or more.
- 2) Output : $-20\text{dB}/0.1\mu\text{V}$ to $120\text{dB}/1\text{V}$.
- 3) Output impedance : 50Ω

12. Tracking Generator

- 1) Center frequency : 50kHz to 200MHz.
- 2) Frequency deviation : $\pm 35\text{MHz}$.
- 3) Output voltage : 100mV or more.

13. Dummy Load

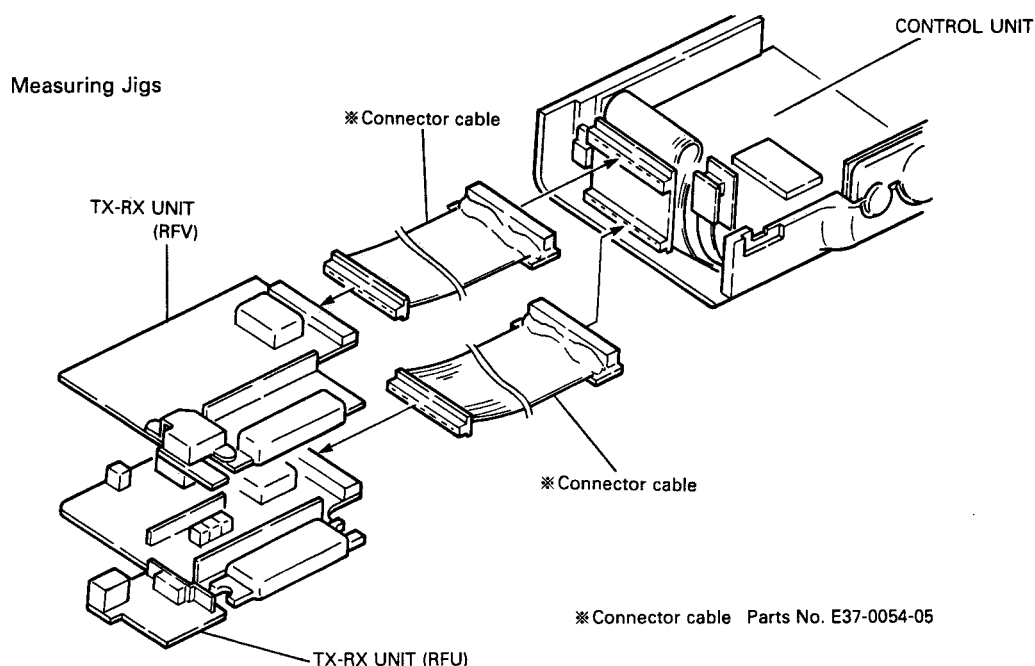
- 1) 8Ω , 3W or more.

Preparation

- Set the unit in the receiving mode and set the controls as follows, unless otherwise specified.

POWER SW.....ON
VHF SQL VR.....MIN
UHF SQL VR.....MIN
HI/LOW.....HI

- Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils).
- To protect the SSG, do not send out signals while adjusting the receiving unit.
- The indicted SSG output levels are for maximum output.



※Connector cable Parts No. E37-0054-05

ADJUSTMENT

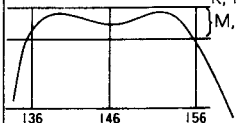
TX-RX COMMON ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Reset	1) While holding the M key down, set the POWER switch to ON.							Display MAIN: 433.000 M, T, X, E MAIN: 440.000 K, P SUB: 144.000 SAVE: ON APO: ON
2. Voltage confirmation	1) External power supply voltage: 9 V	DC V.M		DC IN			Check	

PLL ADJUSTMENT

1. Transmit frequency	1) FREQ.: 439.975 MHz: M, X, T, E 449.975 MHz: K, P	f. counter Power meter		ANT	TX-RX (RFV)	TC201	439.975 MHz 449.975 MHz	±200 Hz
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VHF RX ADJUSTMENT

1. BPF	1) Tracking generator output : -40 dBm Connect the spectrum analyzer to TP2. ATT: 10 dB LOG/DIV: 2 dB	Tracking generator Spectrum analyzer	TX-RX (RFV)	ANT TP2	TX-RX (RFV)	L19 L18 L17		
2. Receive sensitivity	SSG output: -122 dBm/0.18µV 1) FREQ.: 146.05 MHz K, P, M, X FREQ.: 145.05 MHz T, E1, E2 2) FREQ.: 144,05 MHz 3) FREQ.: 147.95 MHz K, P, M, X FREQ.: 145,95 MHz T, E1, E2	Oscilloscope AF V.M Distortion meter SSG Dummy Load		ANT EXT SP			Check	SINAD 12 dB or hgiher.
3. Squelch	1) FREQ.: 145.050 MHz T, E1, E2 FREQ.: 146,050 MHz K, P, M, X SSG output: OFF V SQL VR: At the point where noise disappears.						Check	Knob position 8:30 to 11:00
	2) SSG output: -127 dBm/0.1µV							Squelch is open.
	3) SSG output: -119dBm/0.25µV V SQL VR: MAX							
4. S-meter	1) FREQ.: 145.050 MHz T, E1, E2 FREQ.: 146.050 MHz K, P, M ,X SSG output: -124dBm/0.14µV 2) SSG output: -91dBm/6.3µV 3) SSG output: -127dBm/0.1µV			TX-RX (RFV)	VR1	Adjust so that all the signal-strength segments go on then the last segment blinks.		
						check	All segments on. All segments off.	

UHF RX ADJUSTMENT

1. Receive sensitivity	1) FREQ.: 430.050 MHz M, X, T, E1, E2 FREQ.: 438.050 MHz K, P SSG output: -121 dBm/0.23 μV 2) FREQ.: 430.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P 3) FREQ.: 439.950 MHz M, X, T, E1, E2 FREQ.: 449.950 MHz K, P	Oscilloscope AF V.M Distortion meter SSG Dummy Load		EXT.SP ANT			Check	SINAD 12 dB or higher.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
2. Squelch	1) FREQ.: 435.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P SSG output: OFF U SQL VR: At the point where noise disappears	Oscilloscope AF V.M Distortion meter SSG Dummy Load		EXT.SP			Check	Knob position 8:00 to 11:00
	2) SSG output: -127 dBm/0.1 μ V			ANT				Squelch is open.
	3) SSG output: -118 dBm/0.28 μ V U SQL VR: MAX							
3. S-meter	1) FREQ.: 435.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P SSG output: -95 dBm/4.0 μ V			ANT	CONT	VR6	Adjust so that all the signal-strength segments go on then the last segment blinks.	
	2) SSG output: -83 dBm/5.8 μ V						check	All segments on.
	3) SSG output: -127 dBm/0.1 μ V							All segments off.

SUB-UHF RX ADJUSTMENT

1. Receive sensitivity	1) FREQ.: 439.950 MHz M, X, T, E1, E2 FREQ.: 449.950 MHz K, P SSG output: -118 dBm/0.28 μ	Oscilloscope AF V.M Distortion meter SSG Dummy Load		ANT EXT SP	TX/RX (RFV) SUB-U	TC201 TC202	Check MAX imum sensitivity	SINAD 12 dB or higher.
	2) FREQ.: 430.050 MHz M, X, T, E1, E2 FREQ.: 438.050 MHz K, P						Check	
	3) FREQ.: 435.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P							
2. Squelch	1) FREQ.: 435.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P SSG output: OFF U SQL VR: At the point where noise disappears						Check	Knob position 8:00 to 11:00
	2) SSG output: -127 dBm/0.1 μ V						Check	Squelch is open.
	3) SSG output: -115 dBm/0.4 μ V U SQL VR: MAX							
3. S-meter	1) FREQ.: 435.050 MHz M, X, T, E1, E2 FREQ.: 445.050 MHz K, P SSG output: -77 dBm/31.6 μ V						Check	All segments on
	2) SSG output: -120 dBm/0.22 μ							All segments off.

TX ADJUSTMENT (VHF)

1. Power (LOW)	1) External power supply voltage: 13.8 V FREQ.: 144.975 MHz T, E1, E2 FREQ.: 146.000 MHz K, P, M, X HI/LOW SW: LOW PTT: ON	Power meter Ammeter		ANT	TX-RX (APC)	VR4	0.5 W ADJ	\pm 0.2 W 0.8A or less
	2) FREQ.: 144.000 MHz FREQ.: 145.975 MHz: T, E1, E2 FREQ.: 147.975 MHz K, P, M, X						Check	0.2 W-0.8 W 0.8 A or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
(HI)	3) HI/LOW SW: HI PTT: ON FREQ.: 144.975 MHz T, E1, E2 FREQ.: 146.000 MHz K, P, M, X	Power meter Ammeter		ANT	TX-RX (APC)	VR3	MAX	5.5 W or more.
							Set to 5.2 W.	1.7 A or less.
	4) FREQ.: 144.000 MHz FREQ.: 145.975 MHz T, E1, E2 FREQ.: 147.975 MHz K, P, M, X						Check	5.0 W~6.5 W 1.7 A or less.
(MID)	5) HI/LOW SW: MID PTT: ON FREQ.: 144.975 MHz T, E1, E2 FREQ.: 146.000 MHz K, P, M, X						Check	1.5 W~3.5 W

TX ADJUSTMENT (UHF)

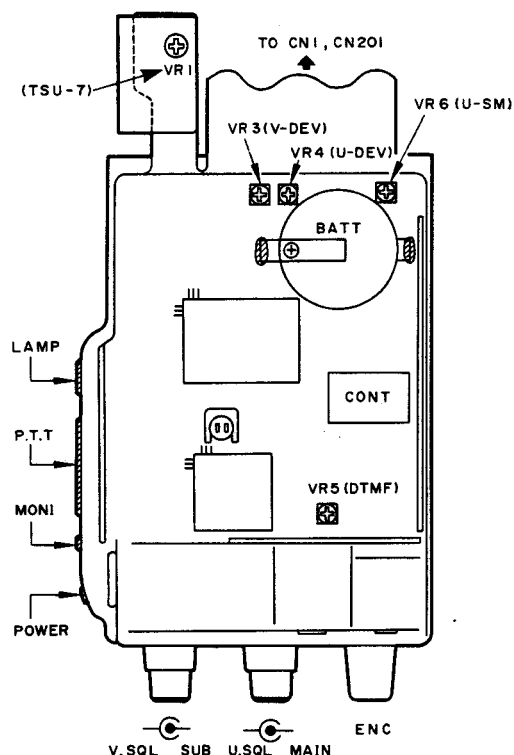
1. Power (LOW)	1) External power supply voltage: 13.8 V FREQ.: 434.975 MHz M, X, T, E1, E2 FREQ.: 444.975 MHz K, P HI/LOW SW: LOW PTT: ON	Power meter Ammeter		ANT	TX-RX (APC)	VR2	0.5 W ADJ	±0.2 W 0.8A or less.
	2) FREQ.: 430.000 MHz M, X, T, E1, E2 FREQ.: 438.000 MHz K, P						Check	0.2 W~0.8 W 0.8 A or less.
	3) FREQ.: 439.975 MHz M, X, T, E1, E2 FREQ.: 449.975 MHz K, P							
(HI)	4) FREQ.: 434.975 MHz M, X, T, E1, E2 FREQ.: 444.975 MHz K, P HI/LOW SW: HI PTT: ON					VR1	MAX	5.5 W or more.
							Set to 5.2 W.	1.7 A or less.
	5) FREQ.: 430.000 MHz M, X, T, E1, E2 FREQ.: 438.000 MHz K, P						Check	5.0 W~6.5 W 1.7 A or less.
	6) FREQ.: 439.975 MHz M, X, T, E1, E2 FREQ.: 449.975 MHz K, P							
(MID)	7) HI/LOW SW: MID PTT: ON FREQ.: 439.975 MHz M, X, T, E1, E2 FREQ.: 449.975 MHz K, P						Check	1.5 W~3.5 W

TX COMMON ADJUSTMENT

1. DEV	1) External power supply voltage: 13.8 V FREQ.: 144.000 MHz AG: 1 kHz/50 mV PTT: ON	Power meter Linear detector f.counter AG Oscilloscope AF V.M		ANT MIC	CONT	VR3	+4.3 kHz ADJ	±100 Hz
	2) FREQ.: 439.975 MHz M, X, T, E1, E2 FREQ.: 439.975 MHz K, P PTT: ON					VR4	+4.3 kHz ADJ	±100 Hz
	3) AG: 1 kHz/5 mV						Check (MIC sensitivity)	±2.6~3.5 kHz
2. DTMF DEV	1) FREQ.: 145.975 MHz T, E1, E2 FREQ.: 147.975 MHz K, P, M, X AG: OFF PTT: ON TONE key: Push					VR5	-3.5 kHz ADJ check (Tone Wave Form)	±200 Hz (Dual tone)
3. TONE DEV	1) TONE key: Push PTT: ON						Check	±0.5~1.25 kHz
	M, X					TSU-7	VR1	±0.8 kHz
	K, P						Check	±2.5~±4.5 kHz
	T, E1, E2							

ADJUSTMENT

Adjustment point



CONT UNIT: X53-333X-XX

CONT UNIT: X53-333X-XX

VR3: VHF DEV

VR4: UHF DEV

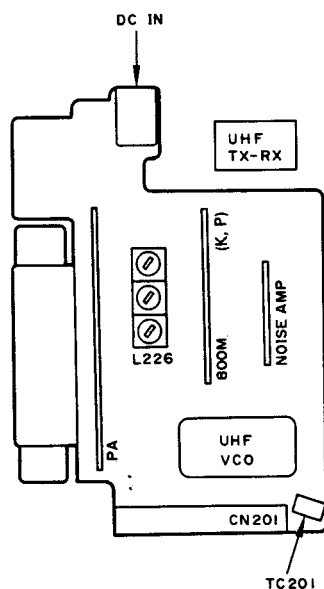
VR5: DTMF DEV

VR6: S-meter (UHF)

CTCSS UNIT: X52-3710-00 (TSU-7)

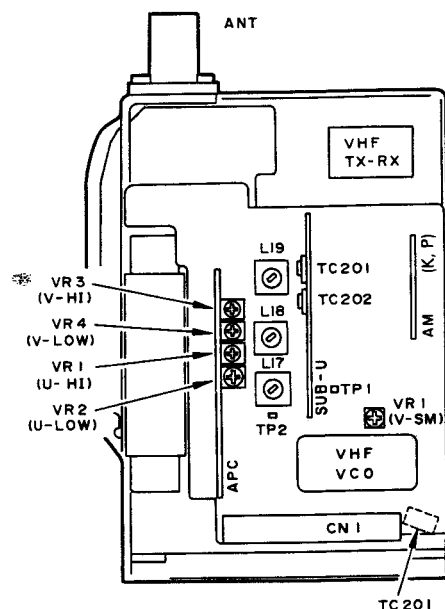
VR1: TONE DEV

TX-RX UNIT (RFU): X57-3630-XX



TC201: TX frequency

TX-RX UNIT (RFV): X57-3630-XX



TX-RX UNIT (RFV): X57-3630-XX

VR1: S-meter (VHF)

L17~19: VHF BPF

SUB UNIT (APC): X58-3770-00 (A)

VR1: UHF high power

VR2: UHF low power

VR3: VHF high power

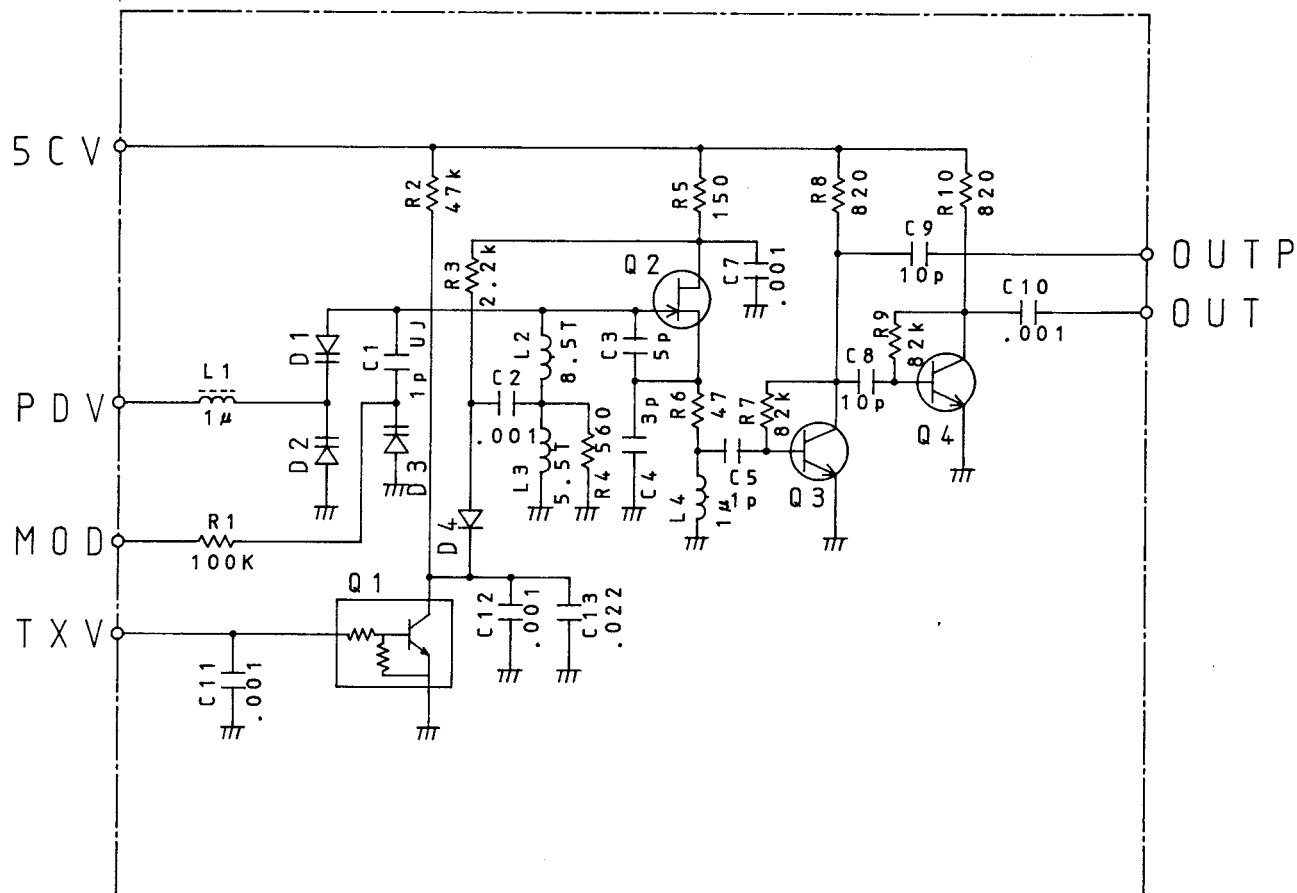
VR4: VHF low power

SUB UNIT (SUB-U): X58-3770-00 (C)

TC201, 202: SUB-UHF RX sensitivity

CIRCUIT DIAGRAM/PC BOARD VIEWS

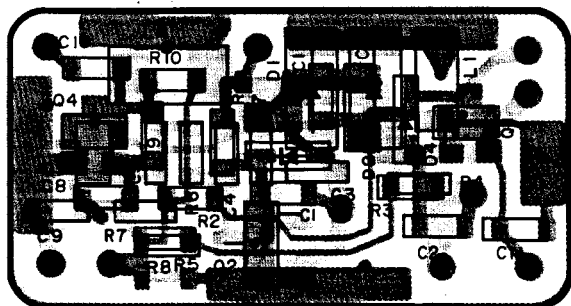
▼VHF VCO(X58-3740-00)



Q1	DTC144EU	D1	MA333
Q2	2SK238 (K17)	D2	MA333
Q3	2SC4083 (N, P)	D3	MA360
Q4	2SC4083 (N, P)	D4	MA77

▼VHF VCO (X58-3740-00)

Component side view

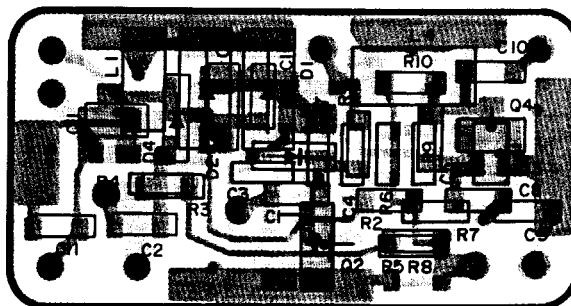


DTC144EU



▼VHF VCO (X58-3740-00)

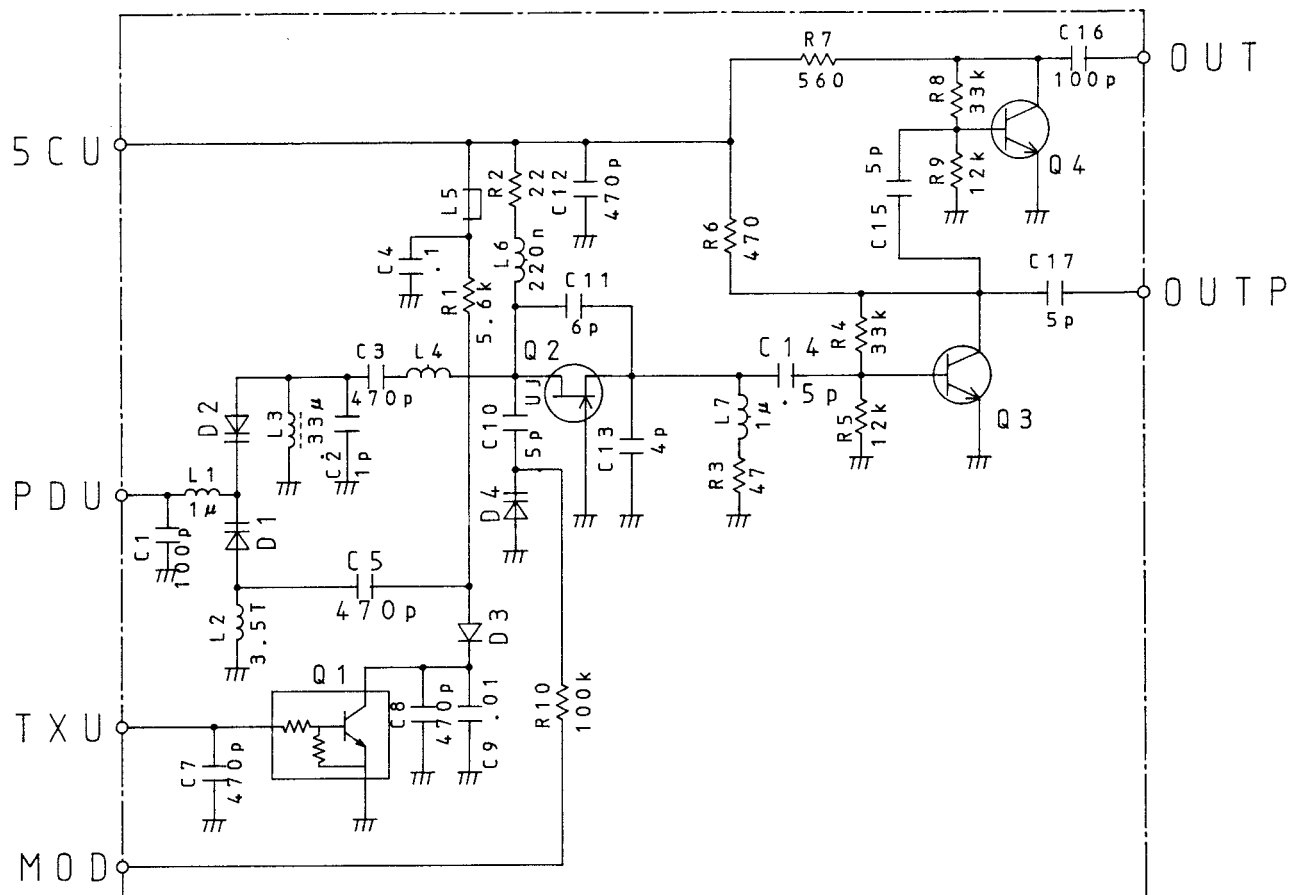
Foil side view



TH-77A/E

CIRCUIT DIAGRAM/PC BOARD VIEWS

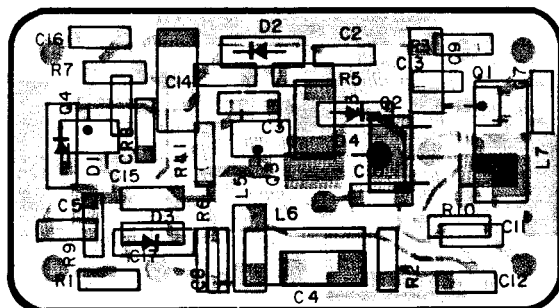
▼UHF VCO (X58-3760-00)



Q1	DTC144EE	D1	MA360
Q2	2SK508NV (K52)	D2	MA360
Q3	2SC4226 (R24, 25)	D3	MA77
Q4	2SC4226 (R24, 25)	D4	MA360

▼UHF VCO (X58-3760-00)

Component side view



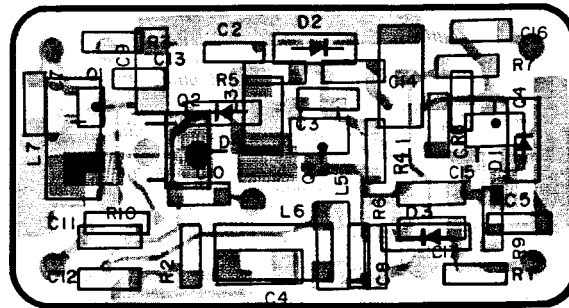
2SK508NV

2SC4226



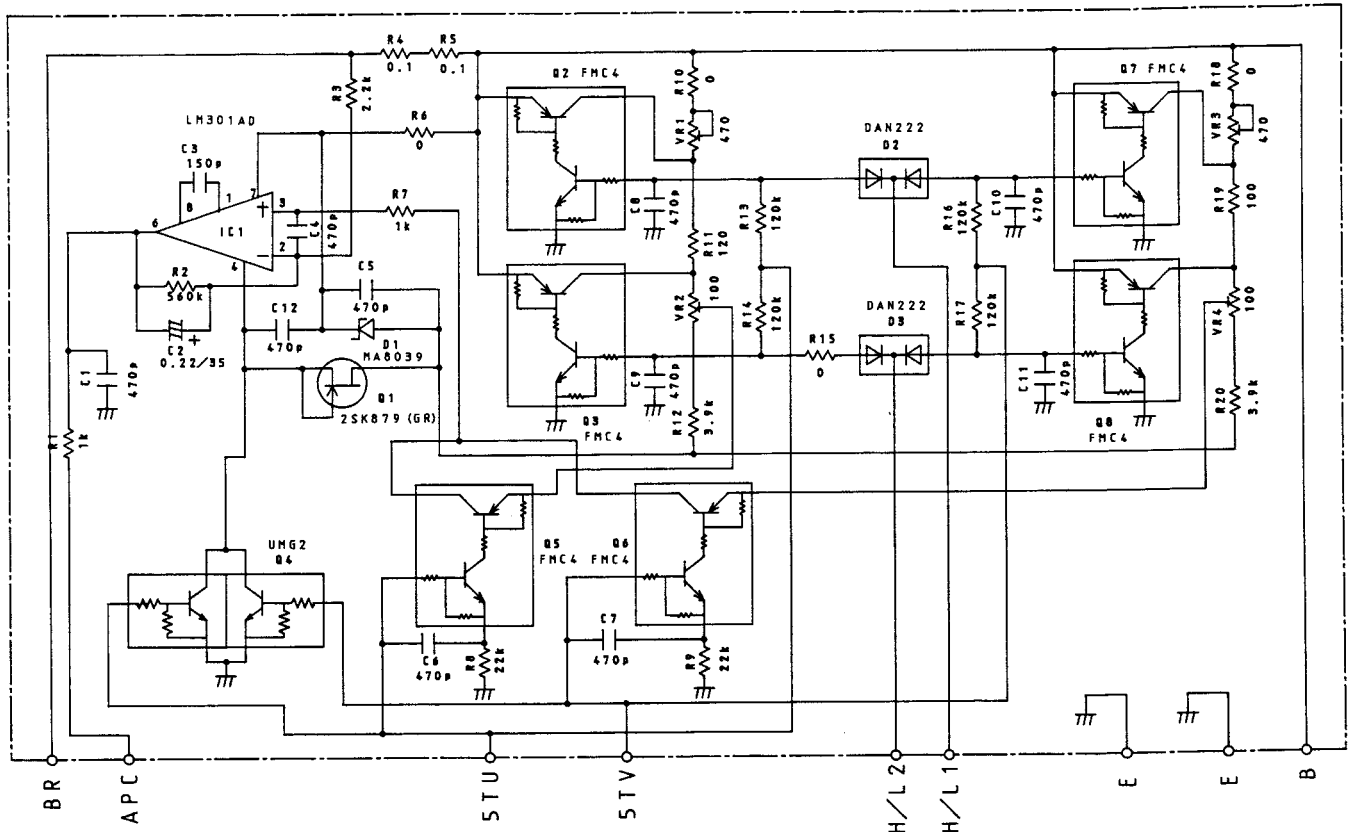
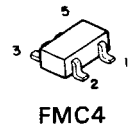
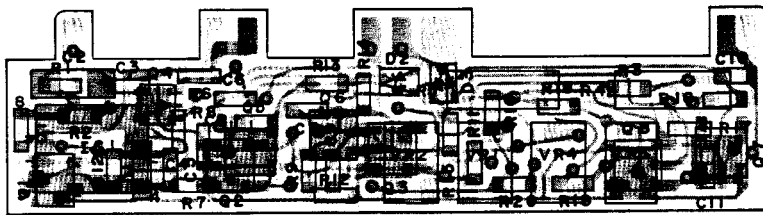
▼UHF VCO (X58-3760-00)

Foil side view

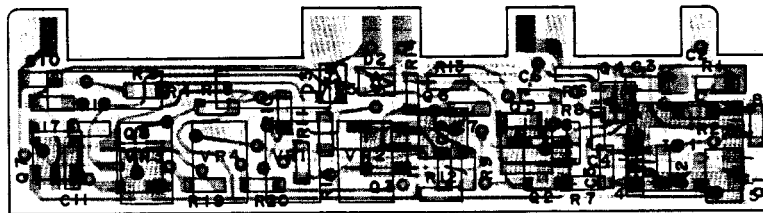


CIRCUIT DIAGRAM/PC BOARD VIEWS

▼APC (X58-3770-00) (A)

▼APC (X58-3770-00) (A)
Component side view

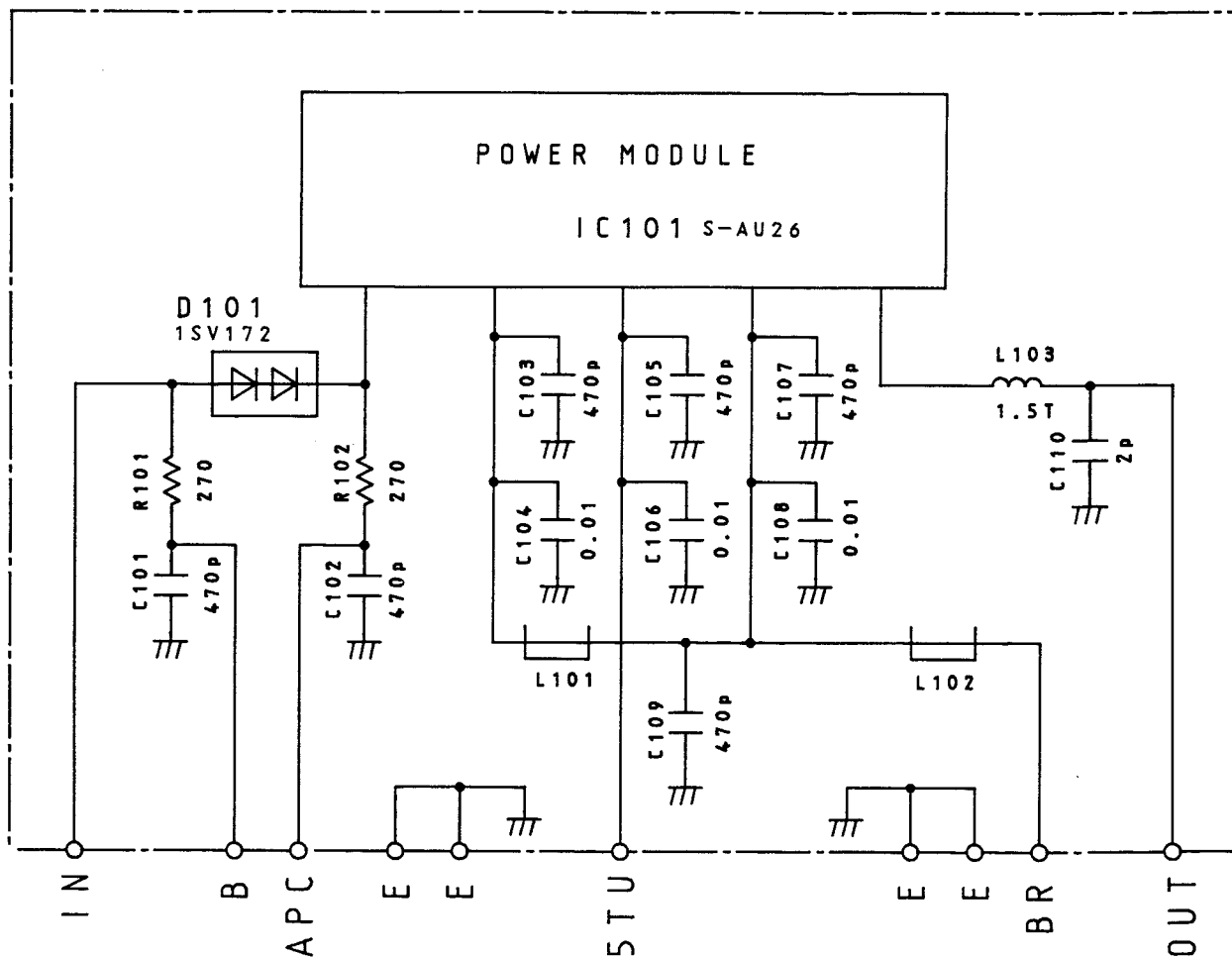
LM301AD

▼APC (X58-3770-00) (A)
Foil side view

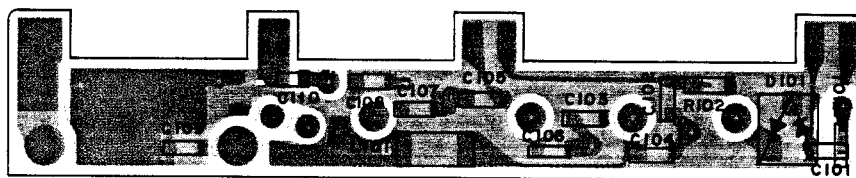
TH-77A/E

CIRCUIT DIAGRAM/PC BOARD VIEWS

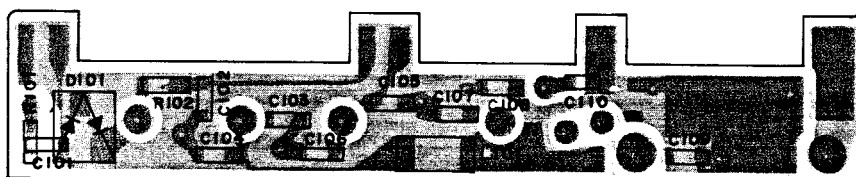
▼PA (X58-3770-00) (B)



▼ PA (X58-3770-00) (B)
Component side view

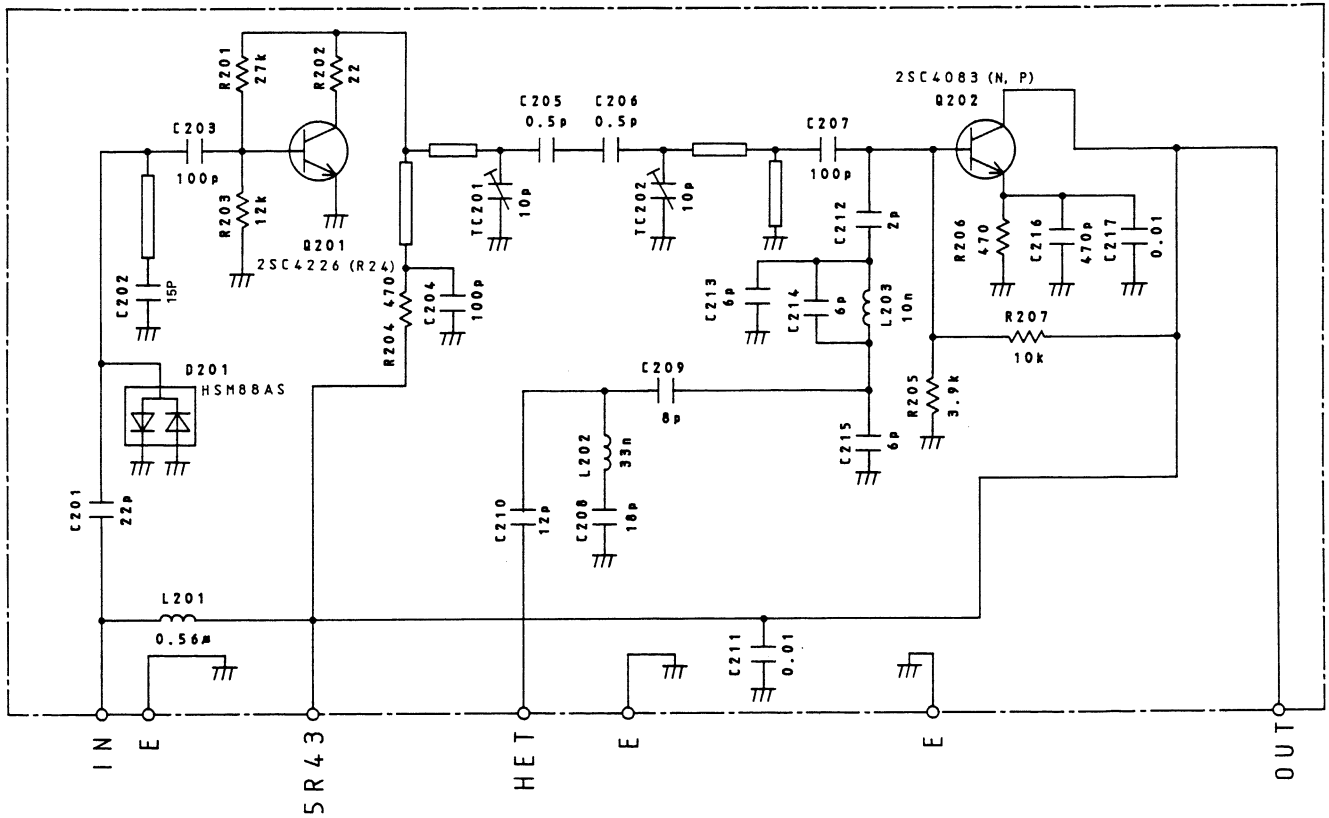


▼ PA (X58-3770-00) (B)
Foil side view



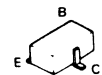
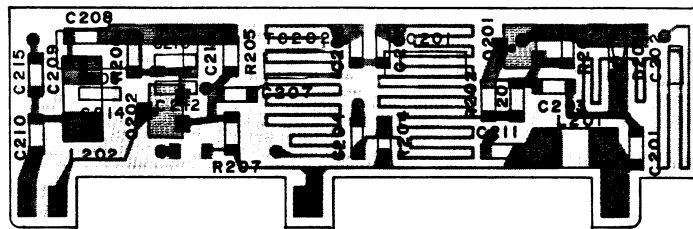
CIRCUIT DIAGRAM/PC BOARD VIEWS

▼ SUB-U (X58-3770-00) (C)



▼ SUB-U (X58-3770-00) (C)

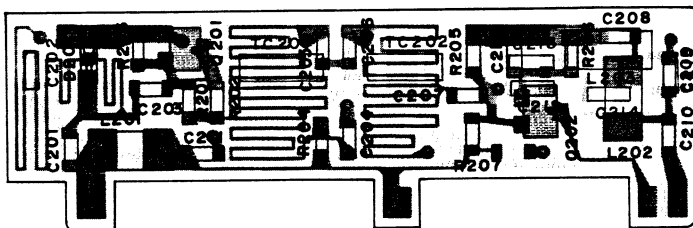
Component side view



2SC4226

▼ SUB-U (X58-3770-00) (C)

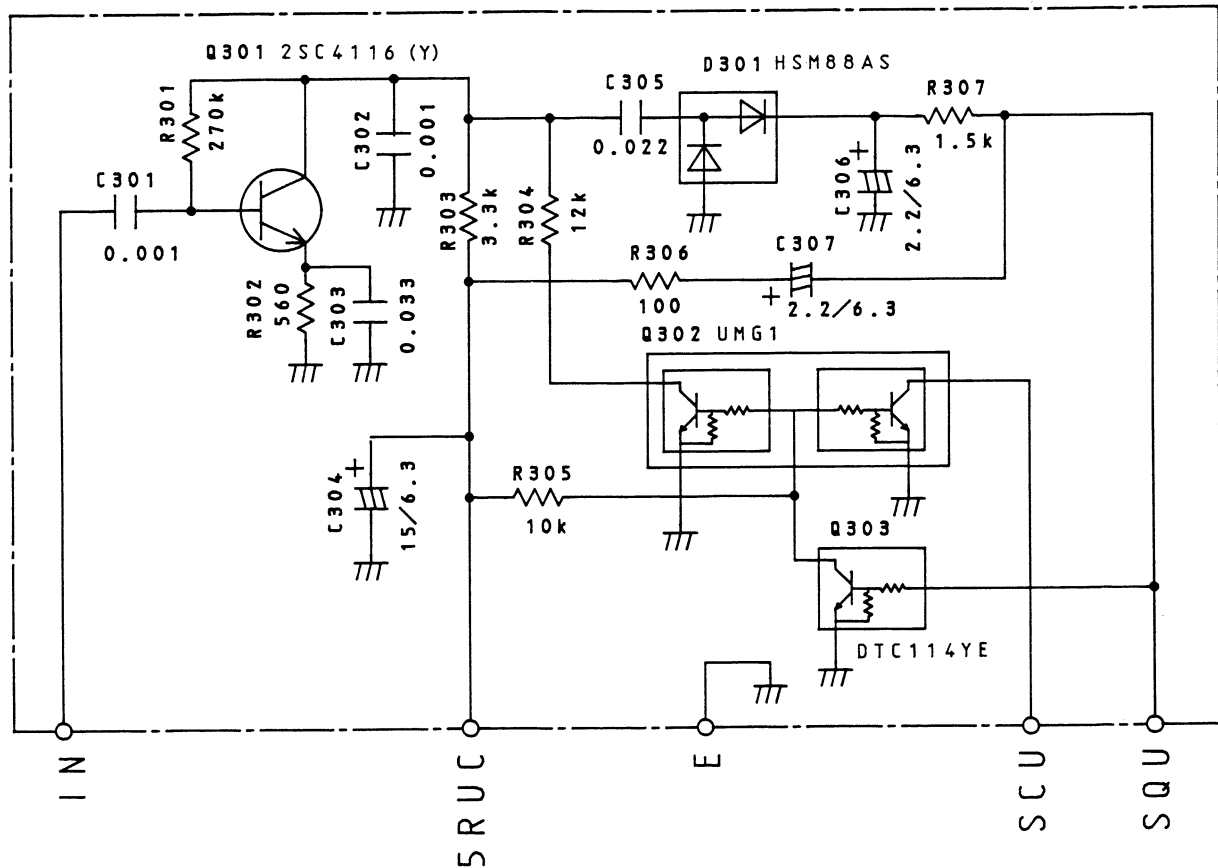
Foil side view



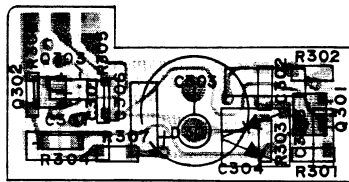
TH-77A/E

CIRCUIT DIAGRAM/PC BOARD VIEWS

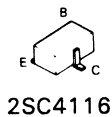
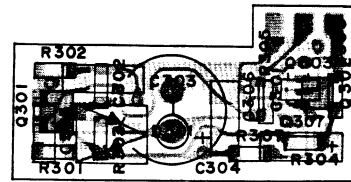
▼ NOISE AMP (X58-3770-00)(D)



▼ NOISE AMP (X58-3770-00) (D) Component side view

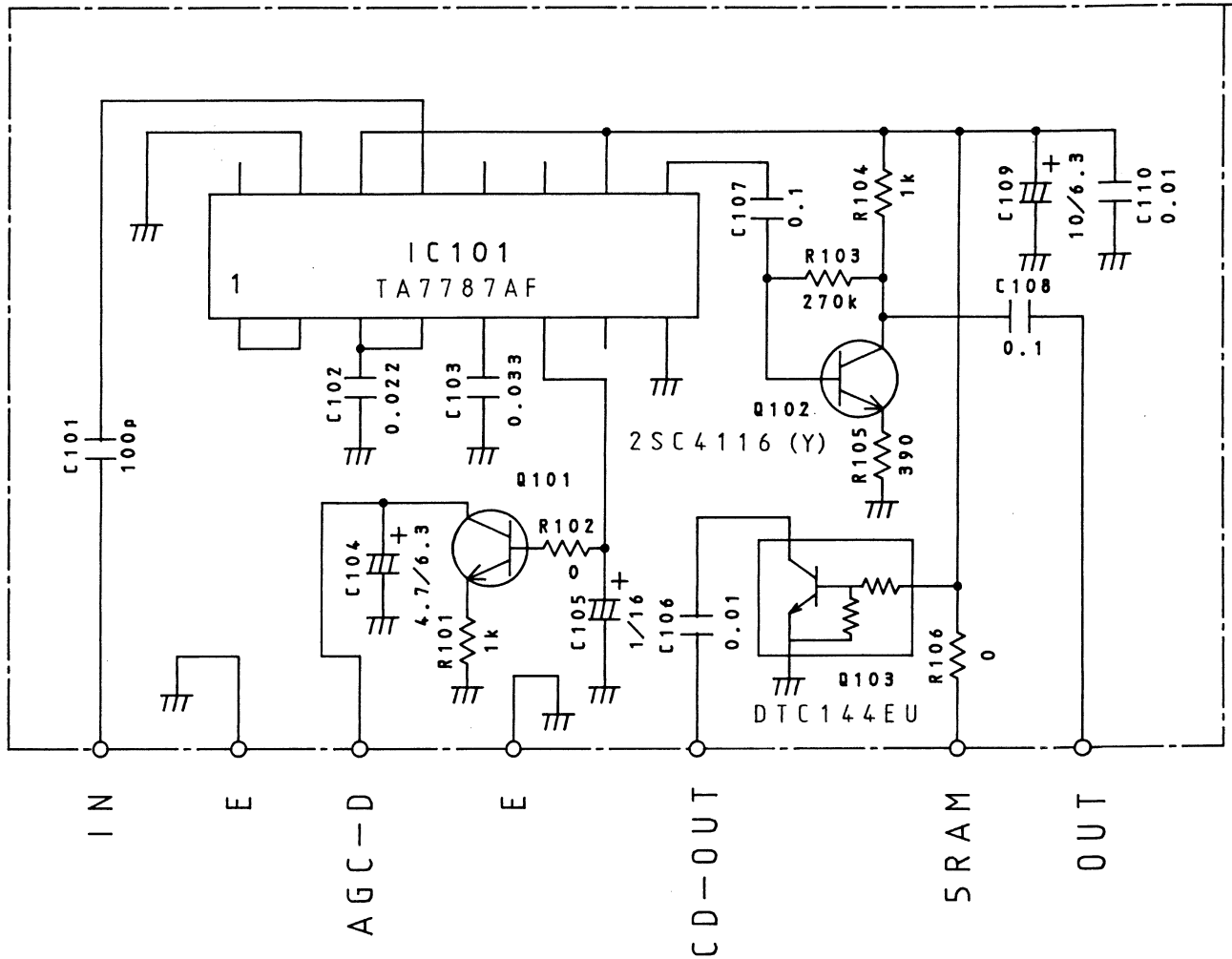


▼ NOISE AMP (X58-3770-00) (D) Foil side view

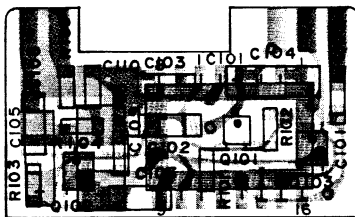


CIRCUIT DIAGRAM/PC BOARD VIEWS

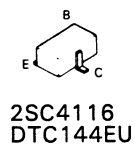
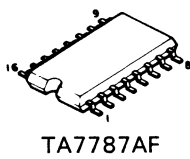
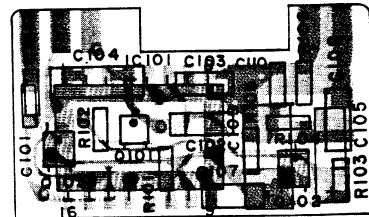
▼ AM (X59-3810-00) (B)



▼ AM (X58-3810-00) (B)
Component side view



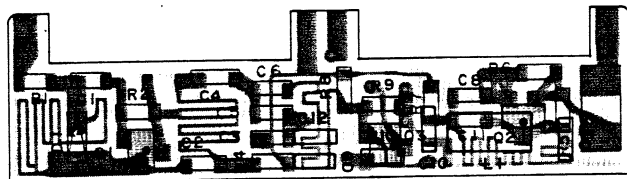
▼ AM (X58-3810-00) (B)
Foil side view



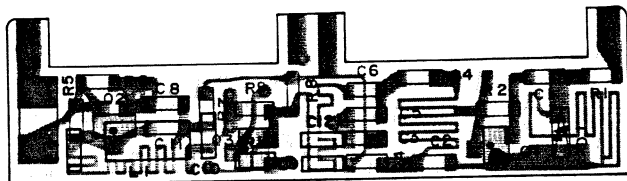
TH-77A/E

PC BOARD VIEWS

▼ 800 MHz (X59-3810-00) (A) Component side view



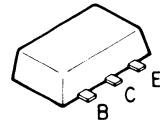
▼ 800 MHz (X59-3810-00) (A) Foil side view



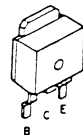
DTB113ZK
DTC144EU
2SC4116



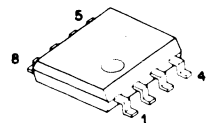
2SB798



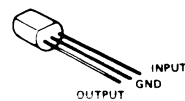
2SB1182F5



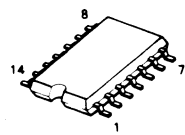
NJM386BM
NJM4560M



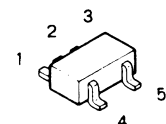
S-8054ALR-LN



TC4066BF

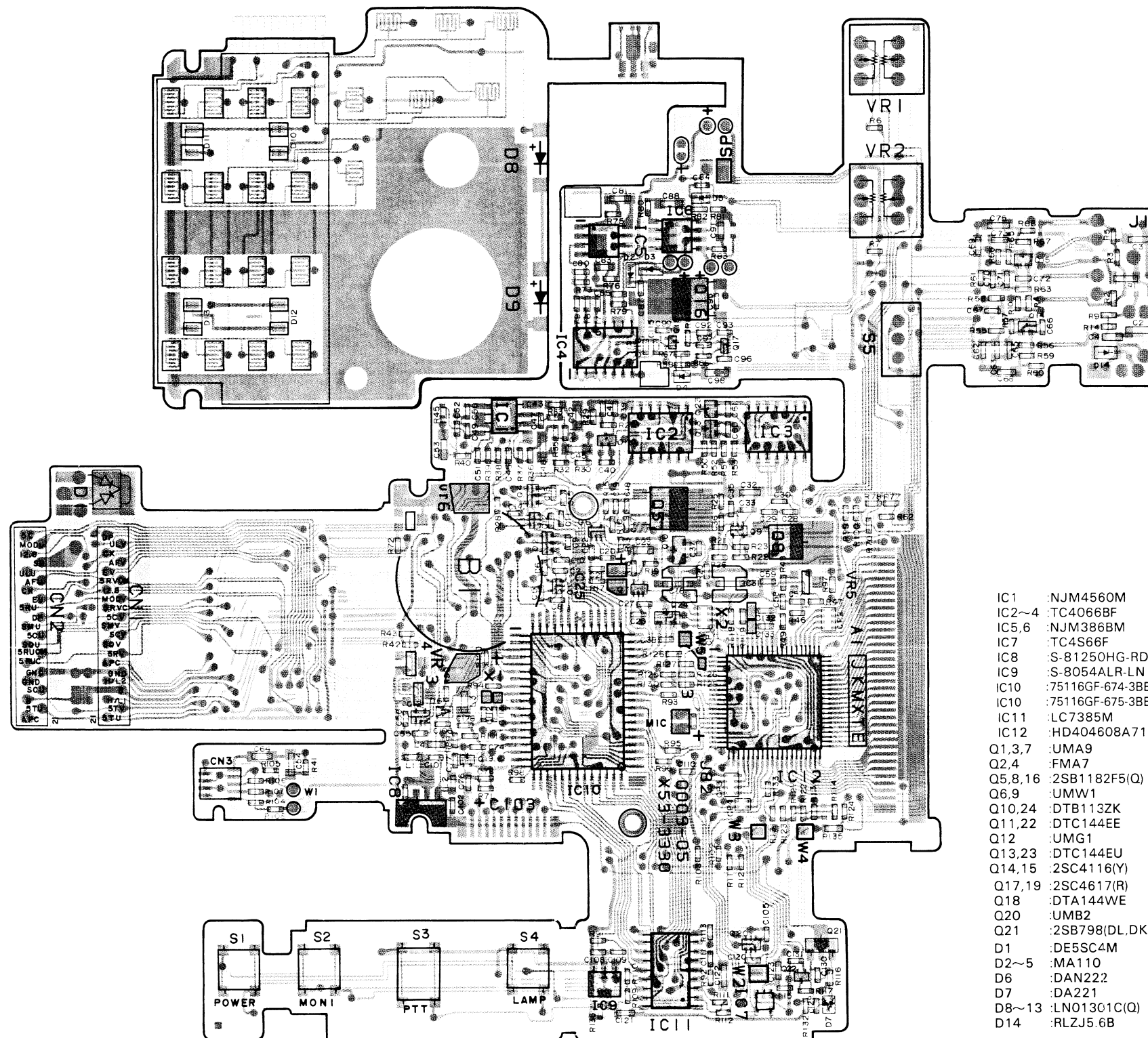


TC4S66F



▼ CONTROL UNIT (X53-333X-XX) Component side view

-11 : K, P -21 : M -51 : T, E1 -71 : X 2-71 : E2



IC1 : NJM4560M
IC2~4 : TC4066BF
IC5,6 : NJM386BM
IC7 : TC4S66F
IC8 : S-81250HG-RD
IC9 : S-8054ALR-LN
IC10 : 75116GF-674-3BE : M, T, X, E
IC10 : 75116GF-675-3BE : K, P
IC11 : LC7385M
IC12 : HD404608A71H
Q1,3,7 : UMA9
Q2,4 : FMA7
Q5,8,16 : 2SB1182F5(Q)
Q6,9 : UMW1
Q10,24 : DTB113ZK
Q11,22 : DTC144EE
Q12 : UMG1
Q13,23 : DTC144EU
Q14,15 : 2SC4116(Y)
Q17,19 : 2SC4617(R)
Q18 : DTA144WE
Q20 : UMB2
Q21 : 2SB798(DL,DK)
D1 : DE5SC4M
D2~5 : MA110
D6 : DAN222
D7 : DA221
D8~13 : LN01301C(Q)
D14 : RLZJ5.6B

TH-77A/E PC BOARD VIEWS

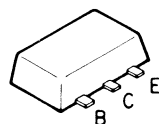
▼ CONTROL UNIT (X53-333X-XX) Foil side view

-11 : K, P -21 : M -51 : T, E1 -71 : X 2-71 : E2

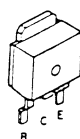
DTB113ZK
DTC144EU
2SC4116



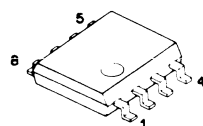
2SB798



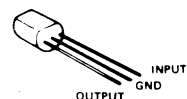
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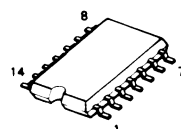
NJM386BM
NJM4560M



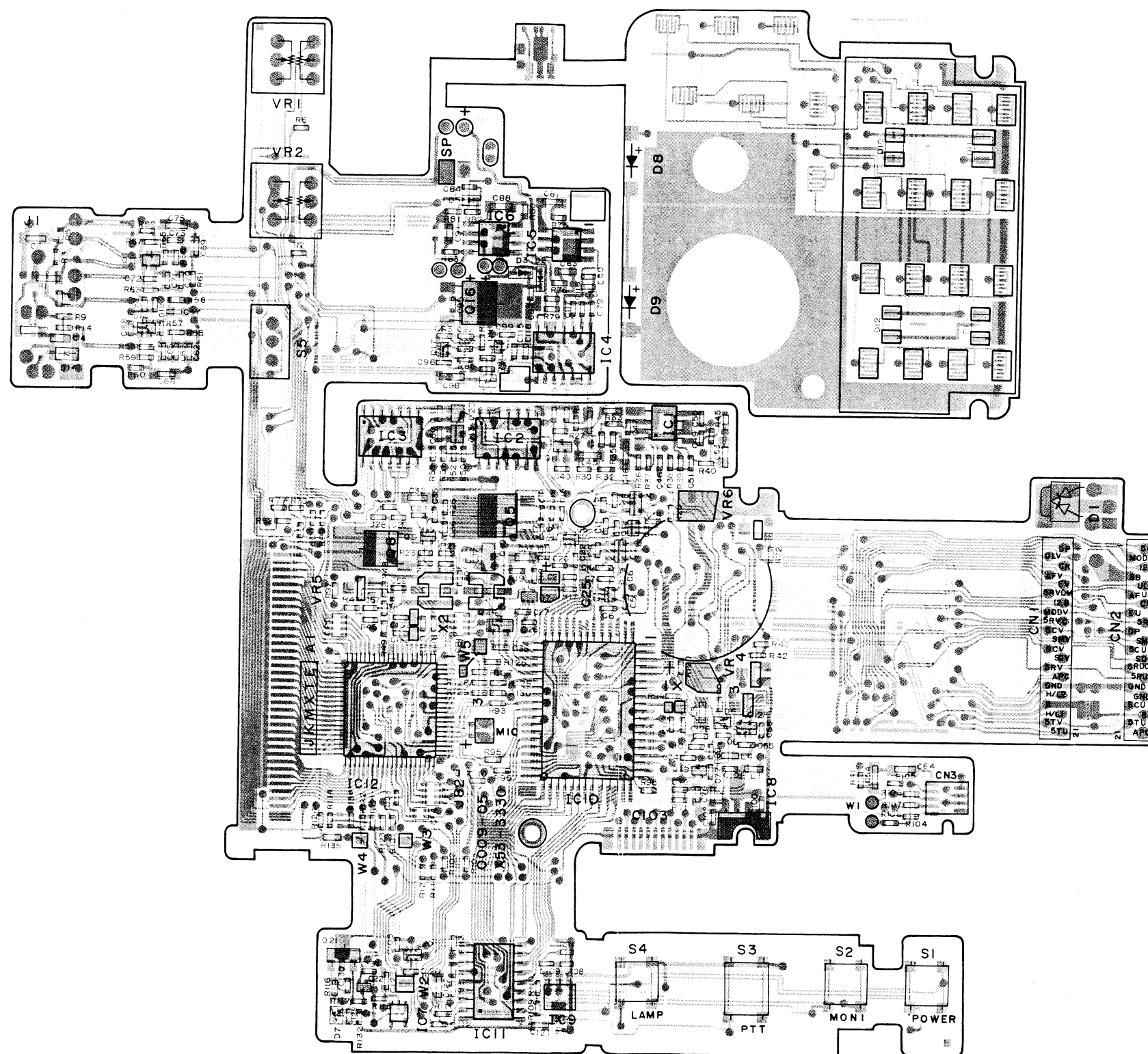
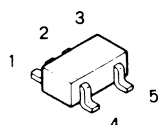
S-8054ALR-LN



TC4066BF

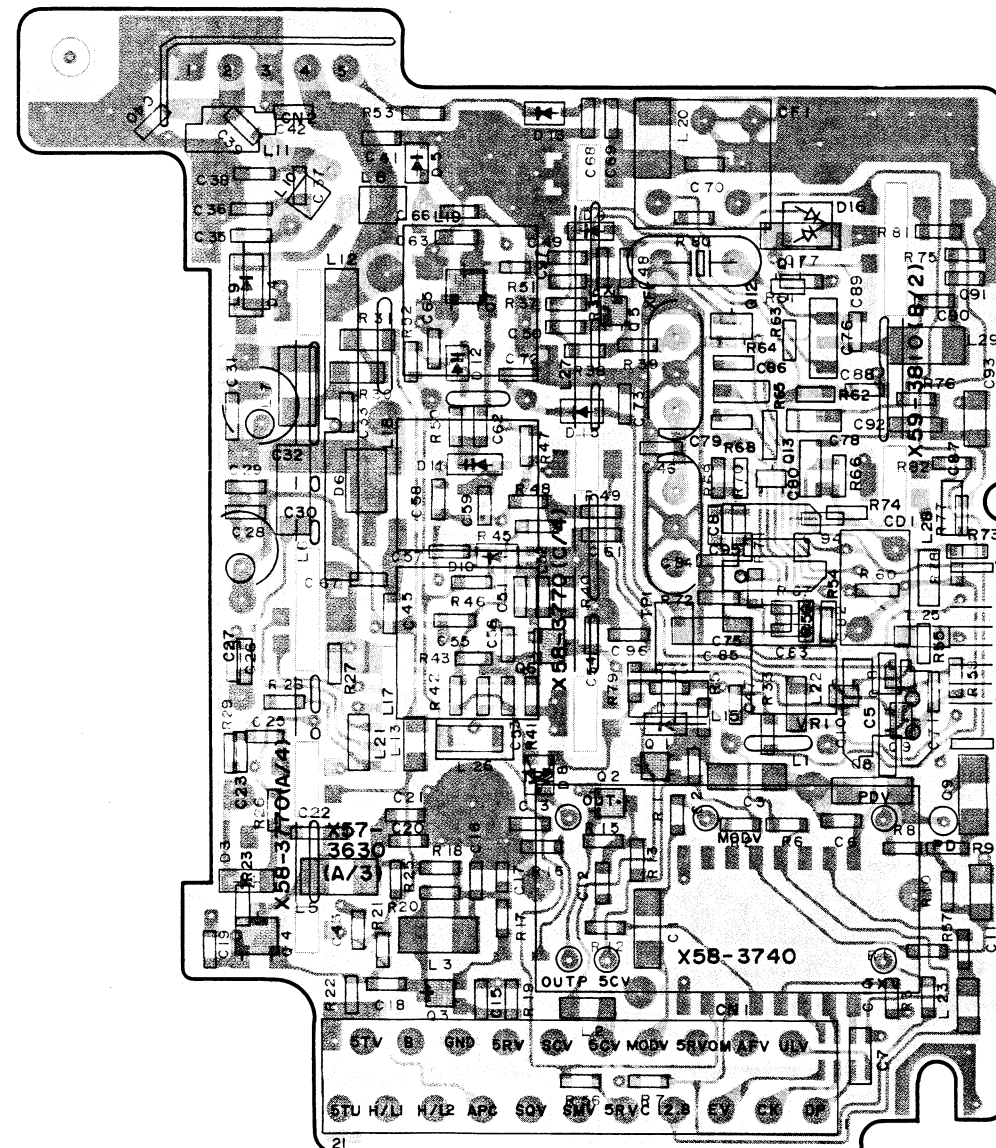


TC4S66F



IC1 : NJM4560M
IC2~4 : TC4066BF
IC5,6 : NJM386BM
IC7 : TC4S66F
IC8 : S-81250HG-RD
IC9 : S-8054ALR-LN
IC10 : 75116GF-674-3BE : M, T, X, E
IC10 : 75116GF-675-3BE : K, P
IC11 : LC7385M
IC12 : HD404608A71H
Q1,3,7 : UMA9
Q2,4 : FMA7
Q5,8,16 : 2SB1182F5(Q)
Q6,9 : UMW1
Q10,24 : DTB113ZK
Q11,22 : DTC144EE
Q12 : UMG1
Q13,23 : DTC144EU
Q14,15 : 2SC4116(Y)
Q17,19 : 2SC4617(R)
Q18 : DTA144WE
Q20 : UMB2
Q21 : 2SB798(DL,DK)
D1 : DE5SC4M
D2~5 : MA110
D6 : DAN222
D7 : DA221
D8~13 : LN01301C(Q)
D14 : RLZJ5.6B

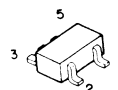
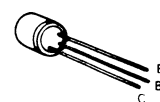
▼ TX-RX UNIT (X57-3630-XX) (RFV) Component side view
-11 : K, P -21 : M, T, X, E



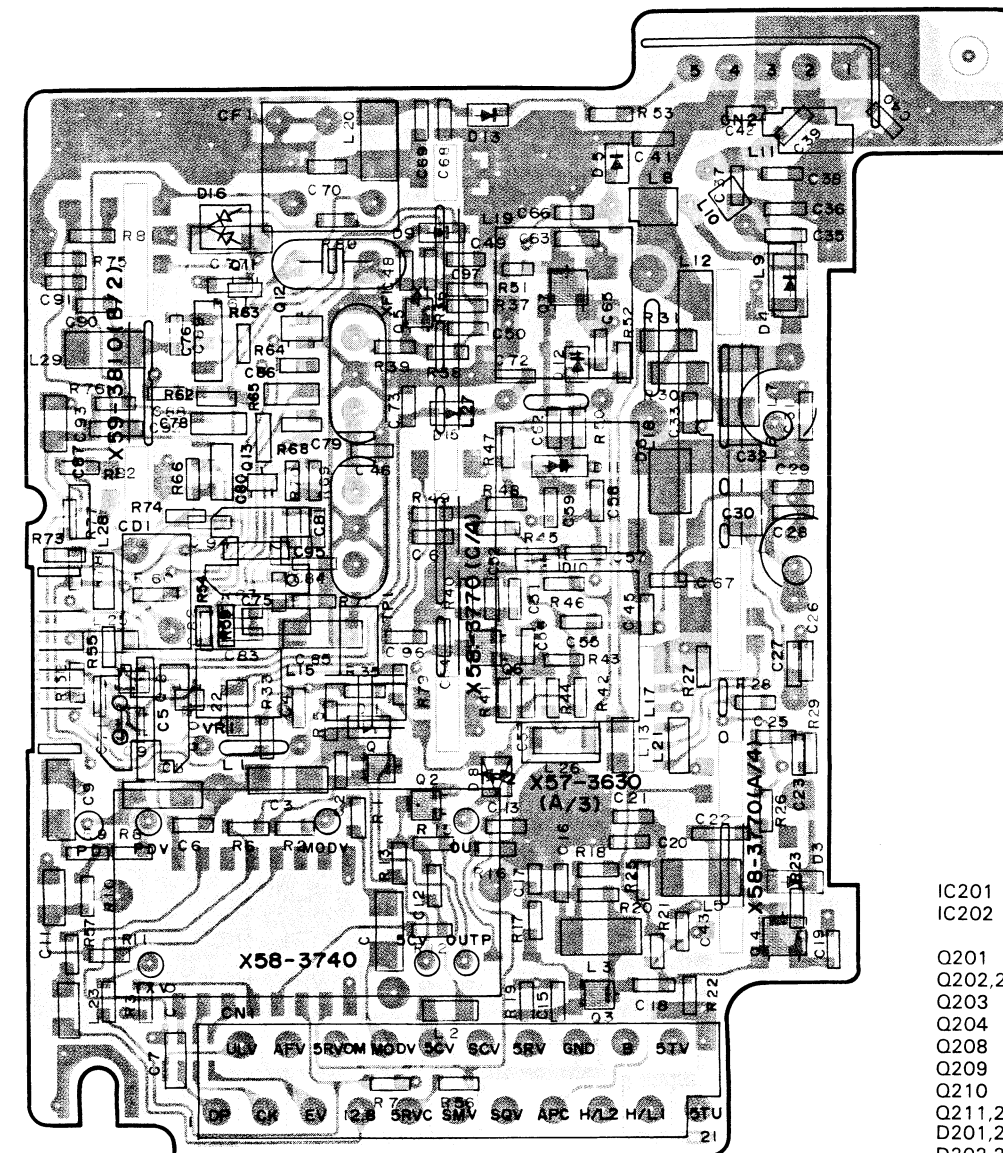
DTA143EU
2SC4116
2SC4215
2SC4226

2SC4093

FMA1



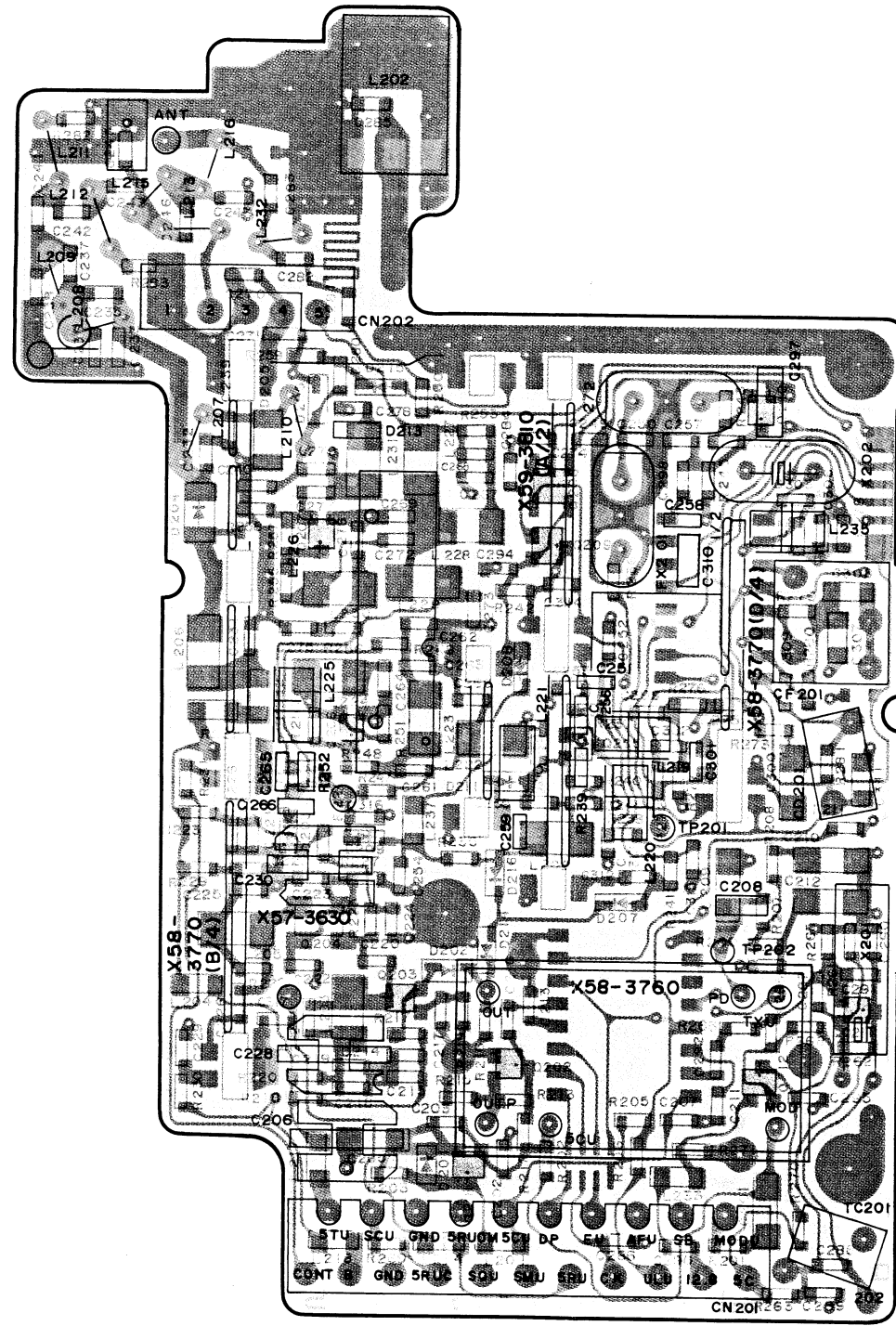
▼ TX-RX UNIT (X57-3630-XX) (RFV) Foil side view
-11 : K, P -21 : M, T, X, E



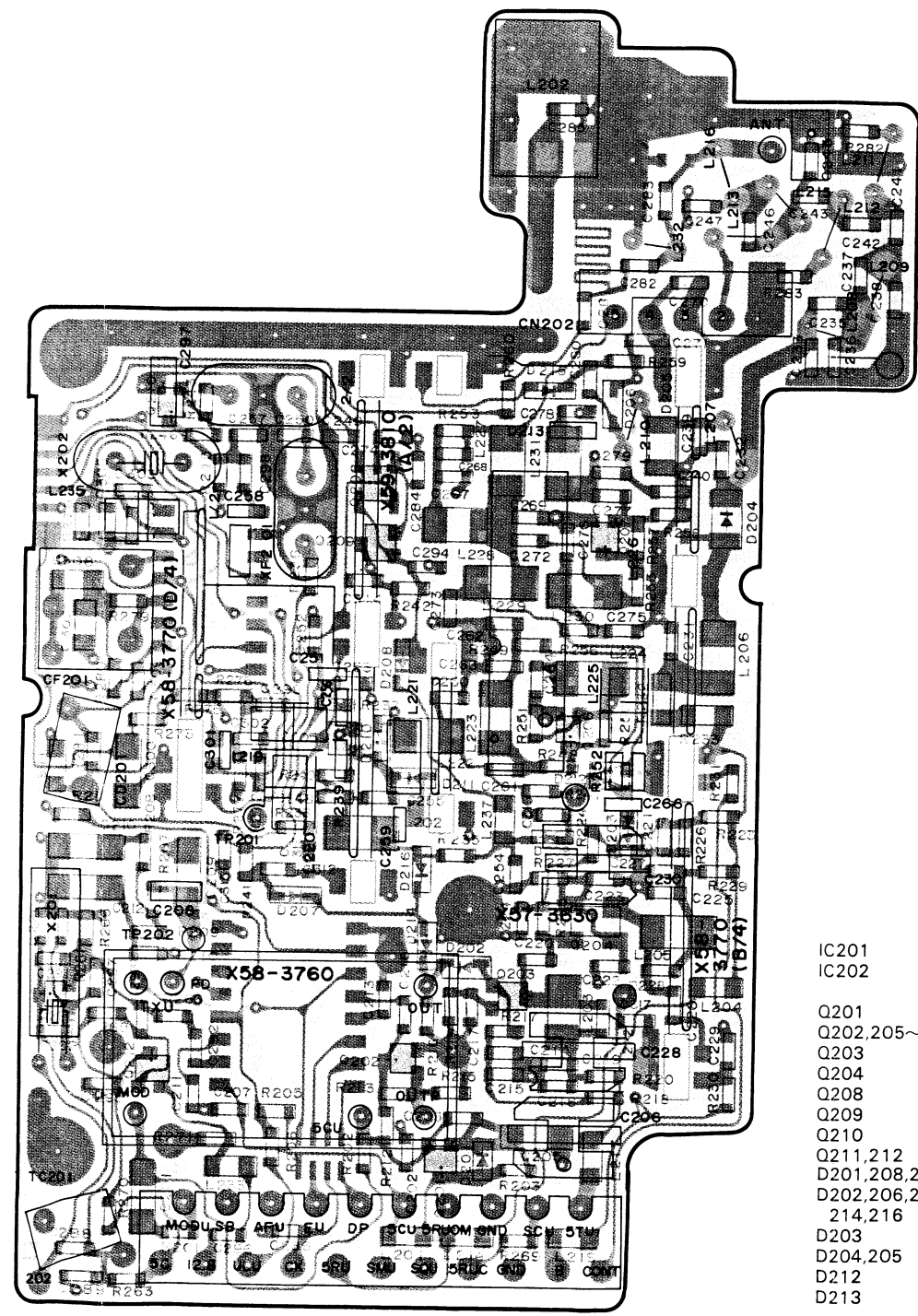
IC201	:M56760FP
IC202	:MC3372D
Q201	:2SC4117(BL)
Q202,205~207	:2SC4226(R24)
Q203	:2SC4226(R23,24)
Q204	:2SC4093(R26,27)
Q208	:FMA1
Q209	:DTA143EU
Q210	:2SC4215(Y)
Q211,212	:2SC4116(Y)
D201,208,209	:MA110
D202,206,210,	
214,216	:MA77
D203	:DA204U
D204,205	:MI808
D212	:ISS300
D213	:HSM88AS

TH-77A/E PC BOARD VIEWS

▼ TX-RX UNIT (X57-3630-XX) (RFU) Component side view
-11 : K, P -21 : M, T, X, E



▼ TX-RX UNIT (X57-3630-XX) (RFU) Foil side view
-11 : K, P -21 : M, T, X, E

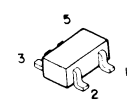
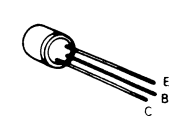


IC201	:M56760FP
IC202	:MC3372D
Q201	:2SC4117(BL)
Q202, 205~207	:2SC4226(R24)
Q203	:2SC4226(R23, 24)
Q204	:2SC4093(R26, 27)
Q208	:FMA1
Q209	:DTA143EU
Q210	:2SC4215(Y)
Q211, 212	:2SC4116(Y)
D201, 208, 209	:MA110
D202, 206, 210, 214, 216	:MA77
D203	:DA204U
D204, 205	:M1808
D212	:ISS300
D213	:HSM88AS

DTA143EU
2SC4116
2SC4215
2SC4226

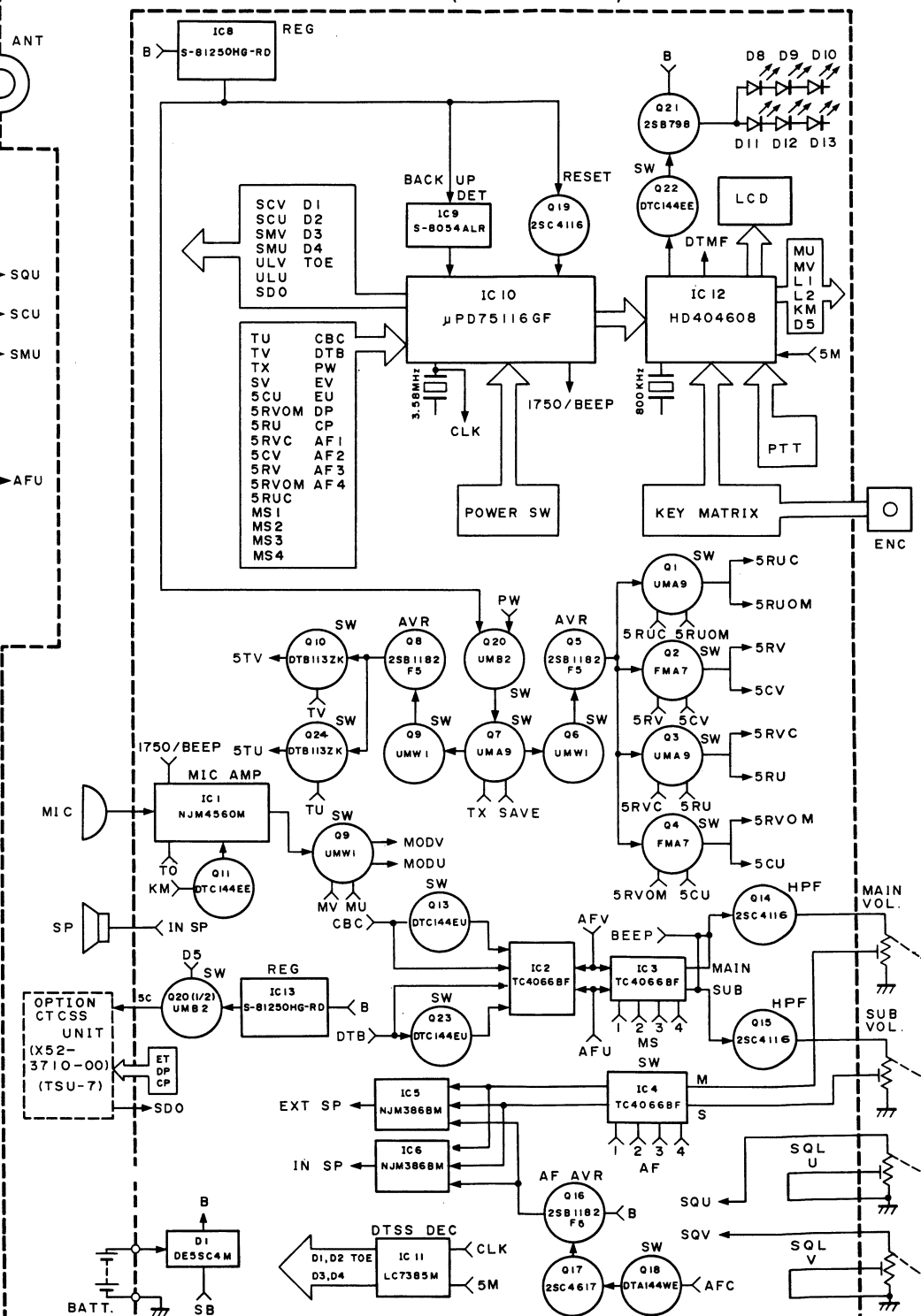
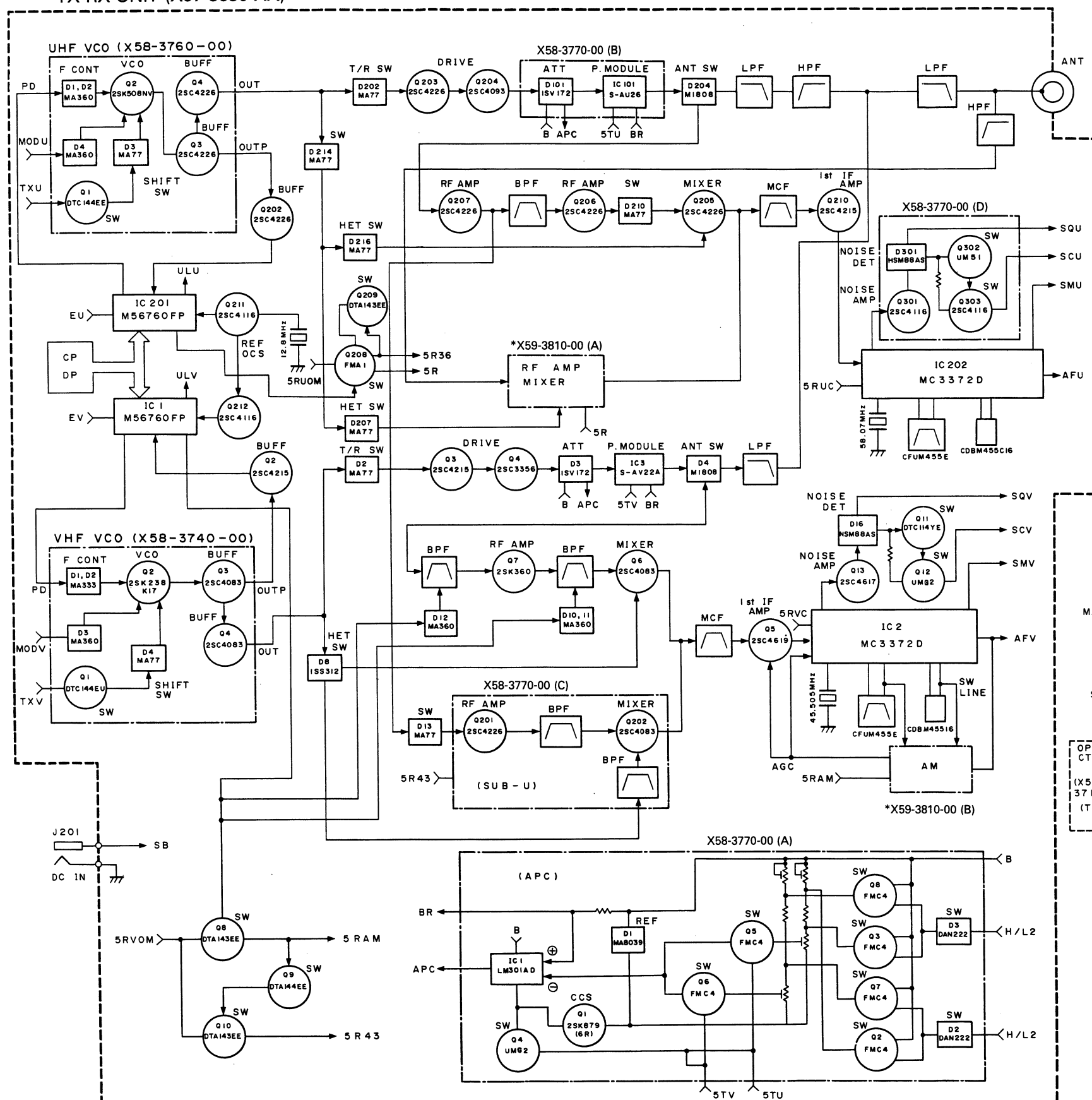
2SC4093

FMA1



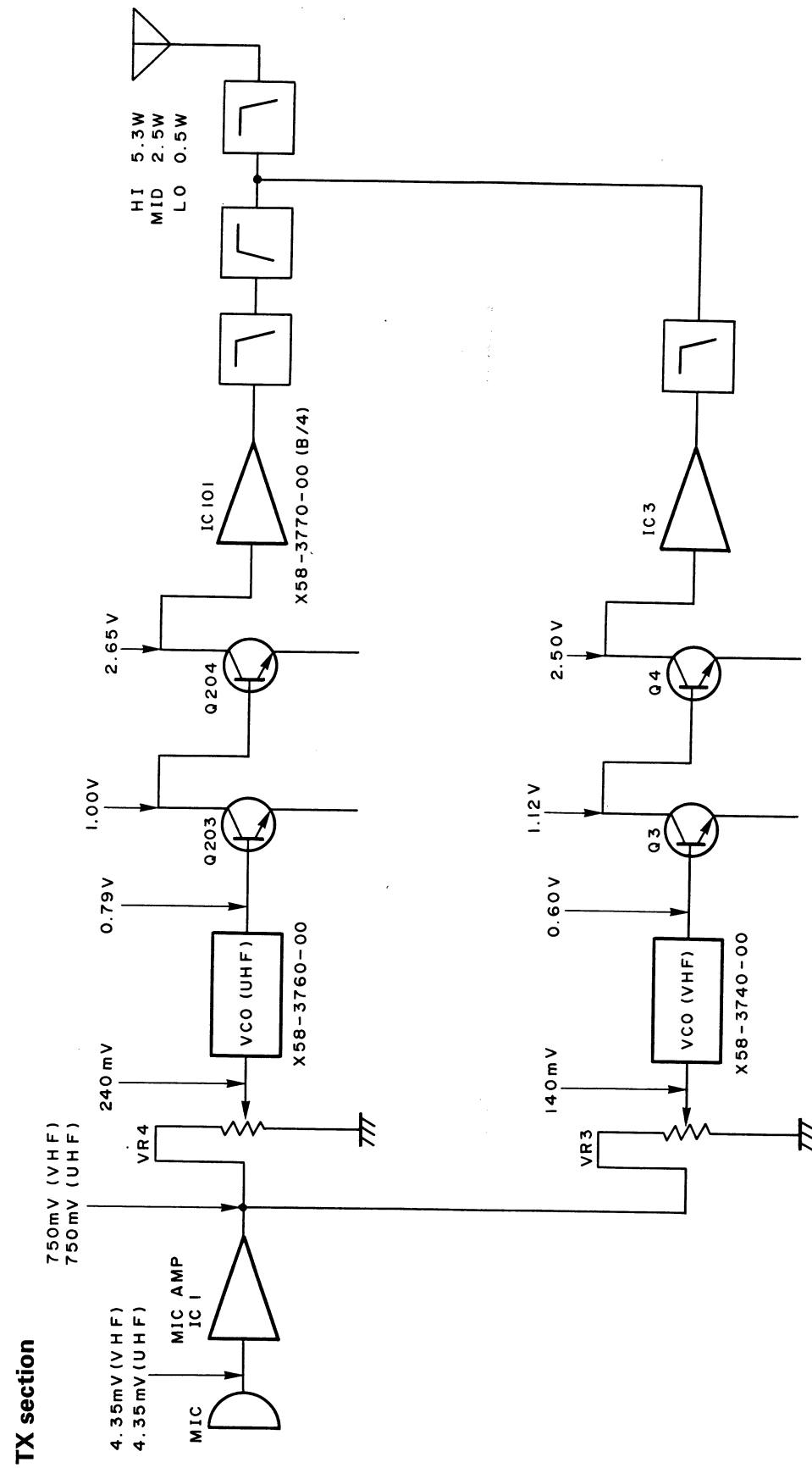
TH-77A/E TH-77A/E

CONTROL UNIT (X53-333X-XX)



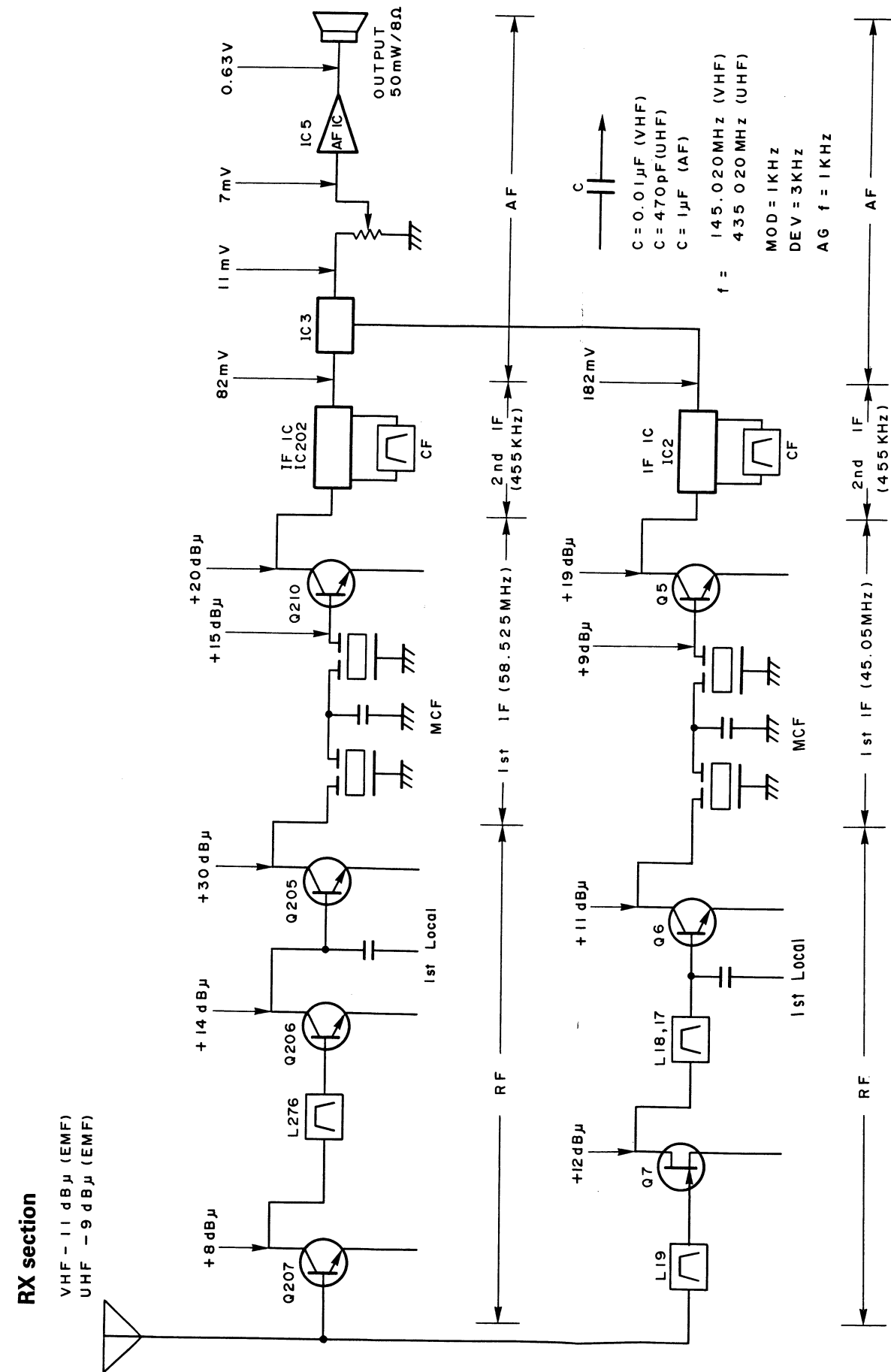
TH-77A/E

LEVEL DIAGRAM



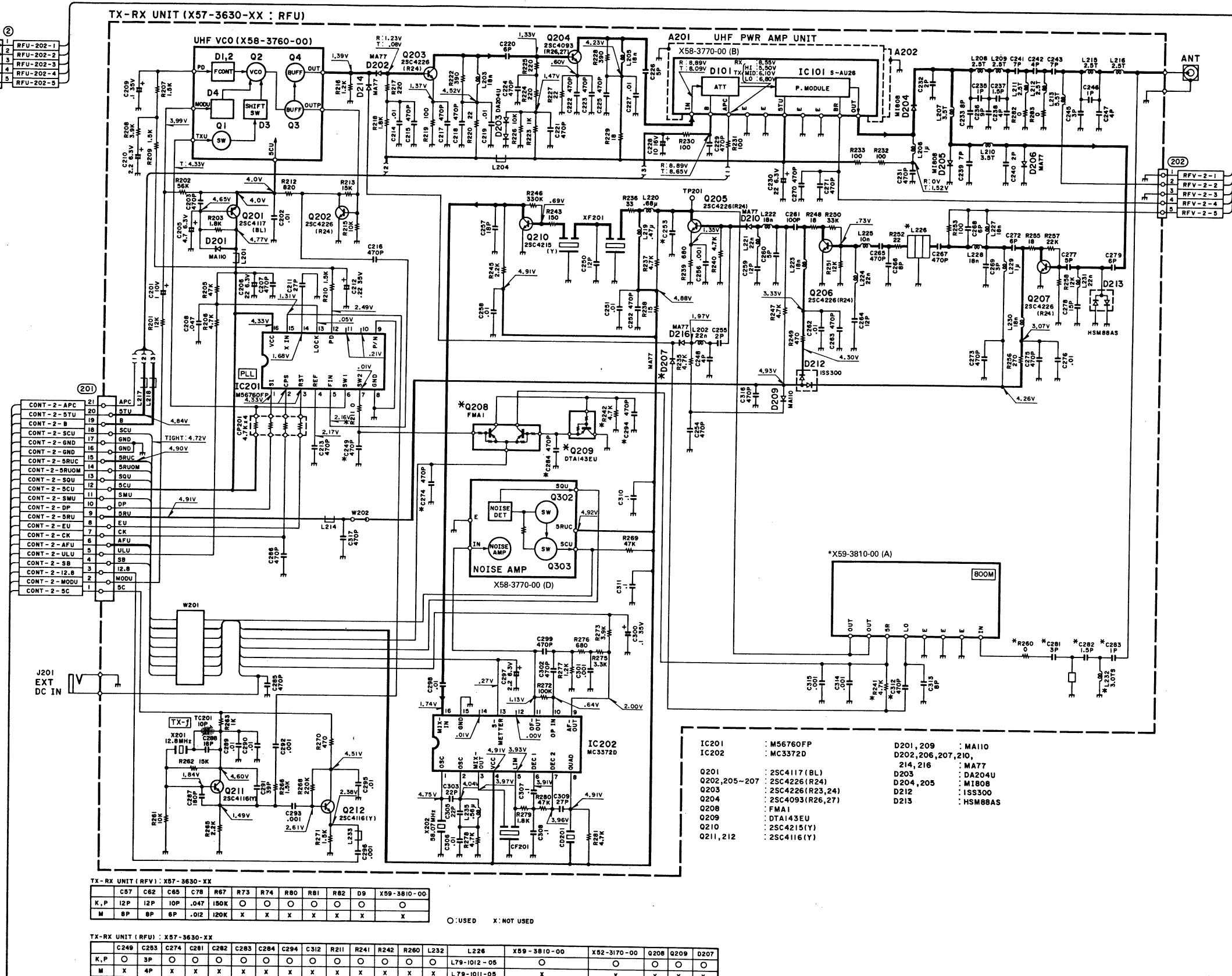
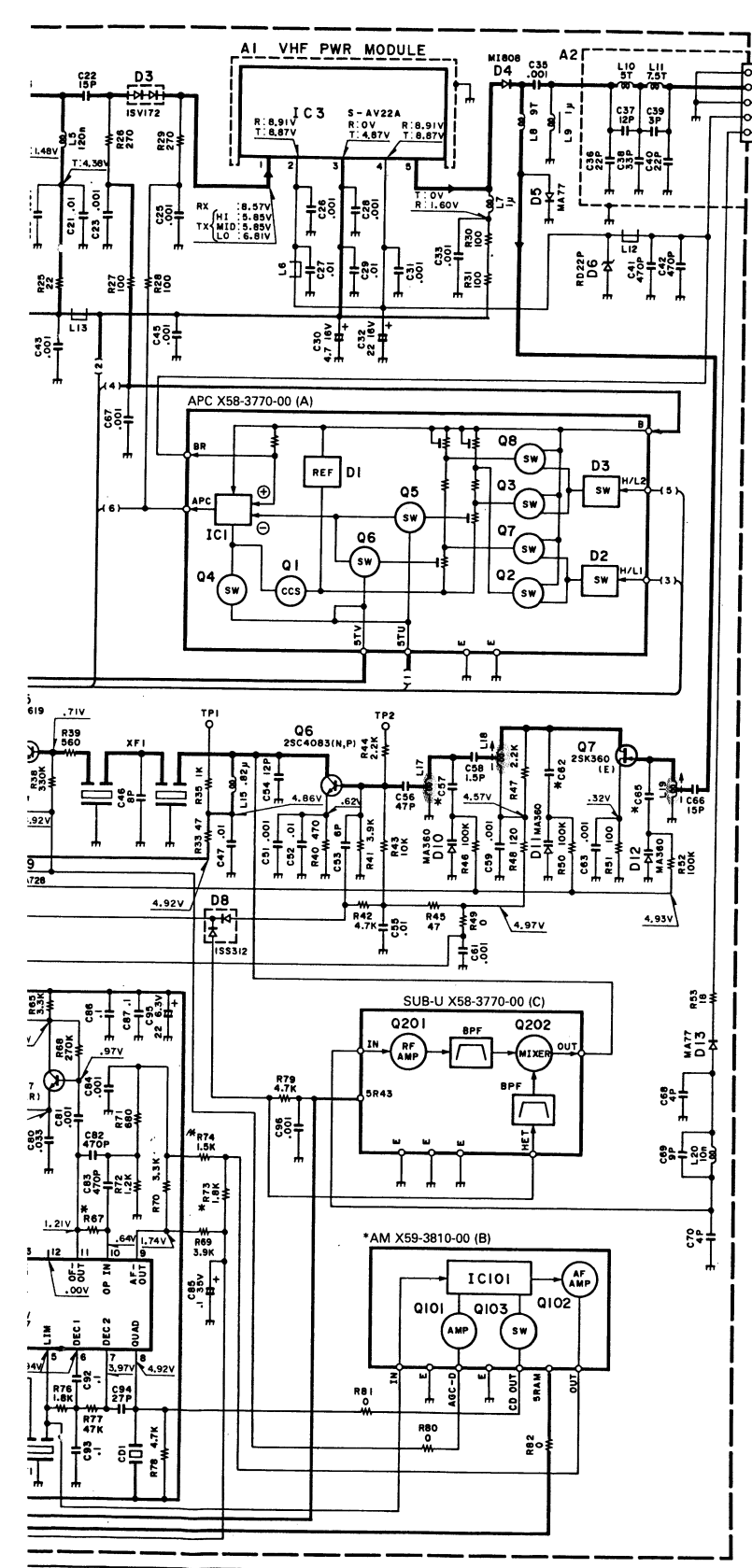
TH-77A/E

LEVEL DIAGRAM



P [REDACTED] Q [REDACTED]

567



TX-RX UNIT (RFU) : X57-3630-XX

K, P	C57	C62	C65	C78	R67	R73	R74	R80	R81	R82	D9	X59-3810-00
M	8P	8P	8P	.012	120K	X	X	X	X	X	X	X

○ : USED X : NOT USED

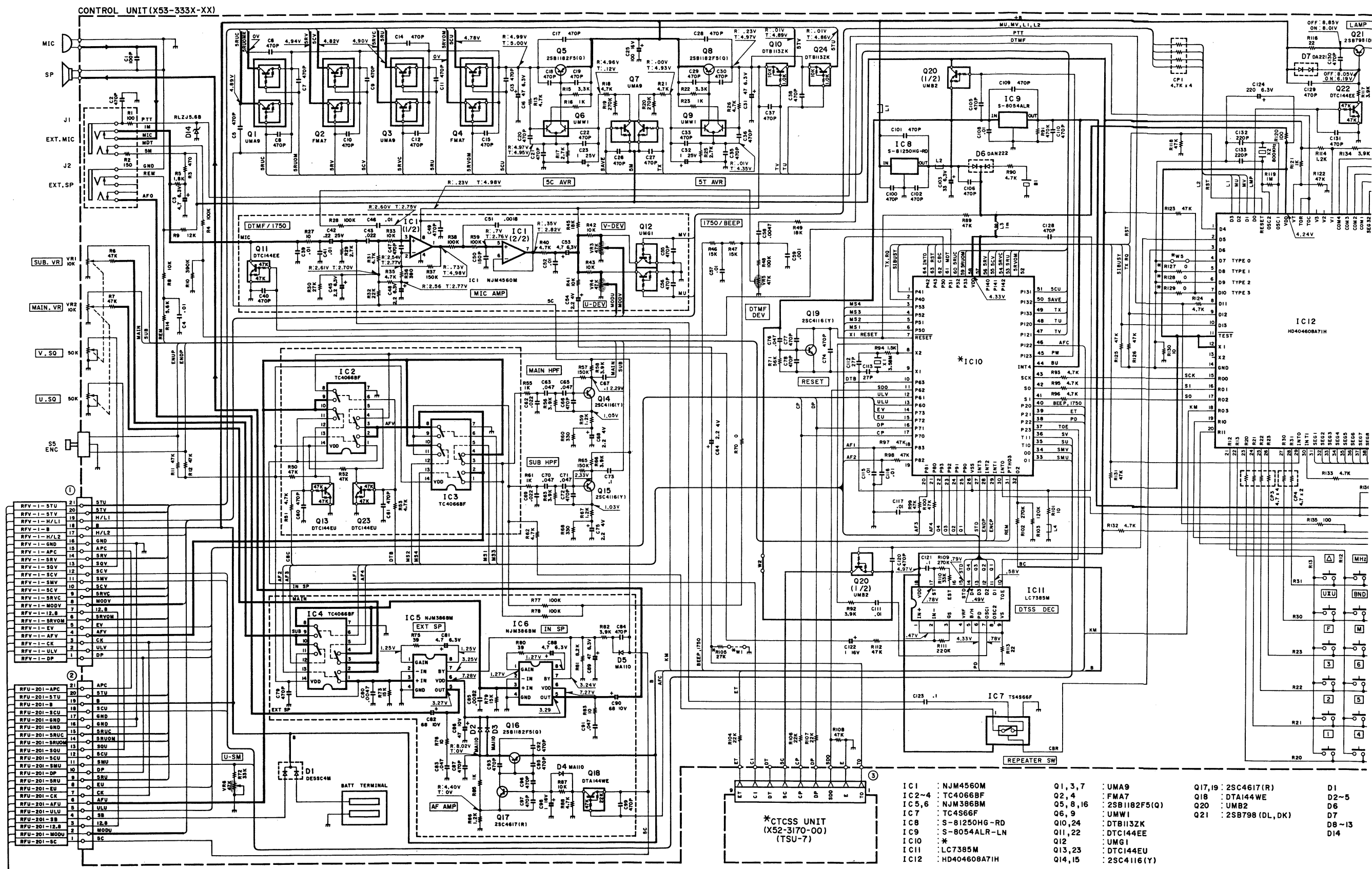
TX-RX UNIT (RFU) : X57-3630-XX

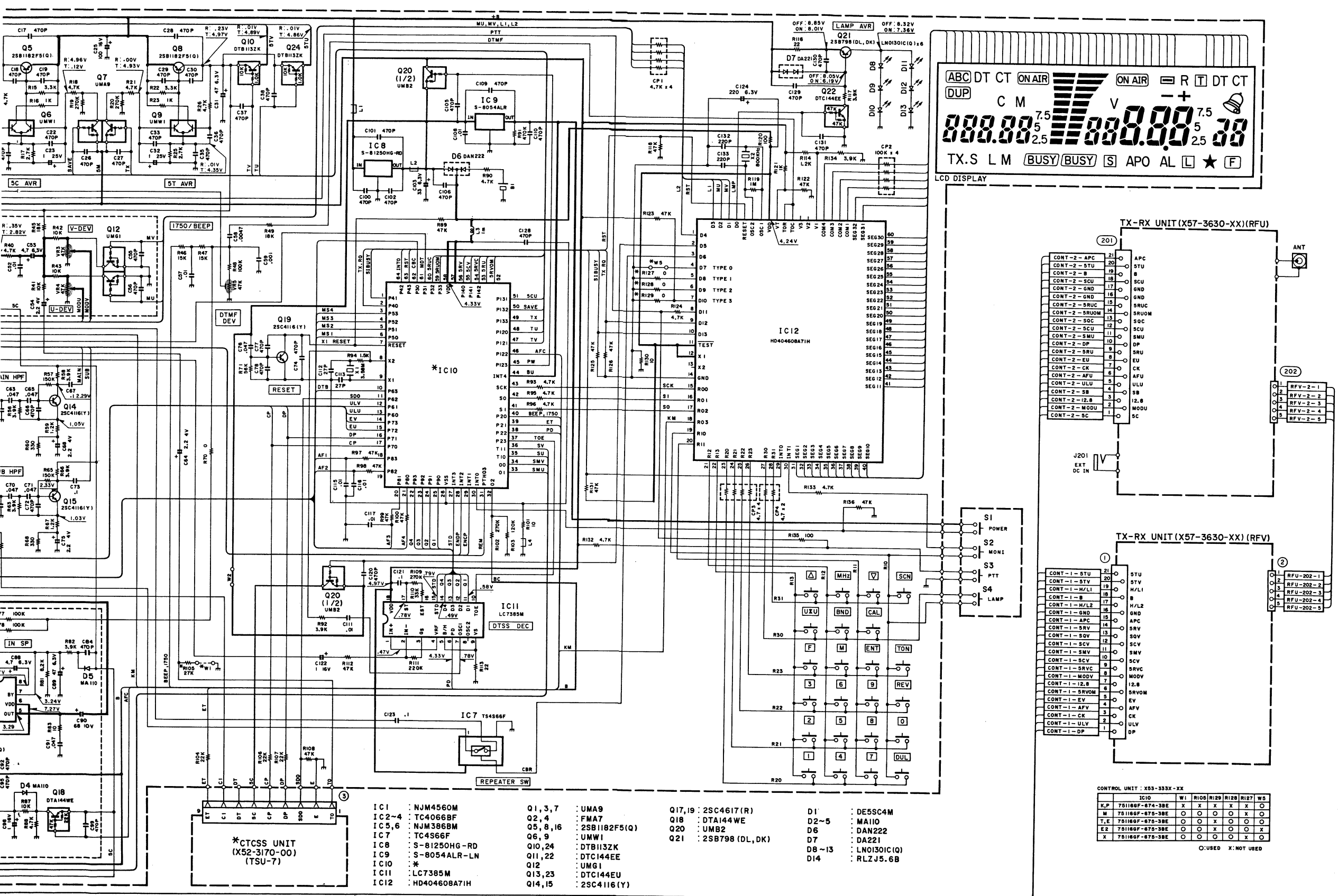
K, P	C249	C253	C274	C281	C282	C283	C284	C294	C312	R211	R241	R242	R260	L232	L226	X59-3810-00	X52-3170-00	Q208	Q209	D207
M	X	4P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TH-77A/E

KENWOOD

SCHEMATIC DIAGRAM





- | | | | |
|---------------------|------------------------|----------------------|---------------------|
| IC1 : NJM4560M | Q1,3,7 : UMA9 | Q17,19 : 2SC4617(R) | D1 : DE55C4M |
| IC2~4 : TC4066BF | Q2,4 : FMA7 | Q18 : DTA144WE | D2~5 : MA110 |
| IC5,6 : NJM3868M | Q5,8,16 : 2SB1182F5(Q) | Q20 : UMB2 | D6 : DAN222 |
| IC7 : TC4566F | Q6,9 : UMW1 | Q21 : 2SB798 (DL,DK) | D7 : DA221 |
| IC8 : S-81250HG-RD | Q10,24 : DTB113ZK | | D8~13 : LN0130IC(Q) |
| IC9 : S-8054ALR-LN | Q11,22 : DTC144EE | | D14 : RLZJ5.6B |
| IC10 : * | Q12 : UMG1 | | |
| IC11 : LC7385M | Q13,23 : DTC144EU | | |
| IC12 : HD404608A71H | Q14,15 : 2SC4116(Y) | | |

CONTROL UNIT : X55-333X-XX

K,P	IC10	W1	R105	R129	R128	R127	W5
1	751186F-674-3BE	X	X	X	X	X	O
2	751186F-675-3BE	O	O	O	O	O	O
3	751186F-676-3BE	O	O	O	X	O	O
4	751186F-677-3BE	O	O	O	O	O	X
5	751186F-678-3BE	O	O	O	O	O	O

O:USED X:NOT USED

TERMINAL FUNCTIONS

Pin Functions

Connector No.	Pin No.	Name	Description
Control unit (X53-333X-XX)			
CN1 = CN1 (TX-RX unit RFV: X57-3630-XX)			
CN1	1	DP	VHF PLL circuit serial transmission data line
	2	ULV	VHF PLL unlock detection
	3	CK	VHF PLL circuit serial transmission clock line
	4	AFV	VHF (sub-UHF) audio output
	5	EV	VHF PLL circuit enable line
	6	5RVOM	Receiver block 5 V power supply
	7	12.8	12.8 MHz PLL reference oscillation input
	8	MODV	VHF modulation
	9	5RVC	Receiver common 5 V power supply
	10	5CV	PLL common 5 V power supply
	11	SMV	VHF/sub-UHF signal strength meter output
	12	SCV	Receiver busy signal (Low when squelch is open.)
	13	SQV	Squelch noise detection DC output
	14	5RV	VHF receiver block 5 V power supply
	15	APC	APC control line
	16	GND	Ground
	17	H/L2	APC power selection logic line
	18	B	Line B
	19	H/L1	APC power selection logic line
	20	5TV	VHF transmitter 5 V power supply
	21	5TU	APC daughter selection switch power supply
Control unit (X53-333X-XX)			
CN2 = CN201 (TX-RX unit RFU: X57-3630-XX)			
CN2	1	5CU	PLL common 5 V power supply
	2	MODU	UHF modulation
	3	12.8	12.8 MHz reference oscillation output
	4	SB	Input from external power pin
	5	ULU	UHF PLL unlock detection
	6	AFU	UHF 360/800 AF output
	7	CK	UHF PLL circuit serial transmission clock line
	8	EU	UHF PLL circuit enable line
	9	5RU	UHF receiver block 5 V power supply
	10	DP	UHF PLL circuit serial transmission data line
	11	SMU	UHF/360/800 signal strength meter output
	12	5CU	PLL common 5 V power supply
	13	SQU	Squelch noise detection DC output
	14	5RUOM	800 5 V power supply
	15	5RUC	UHF/800 common 5 V power supply
	16	GND	Ground
	17	GND	Ground
	18	SCU	Receiver busy signal (Low when squelch is open.)
	19	B	Line B
	20	5TU	UHF transmitter block 5 V power supply
	21	APC	UHF APC control line

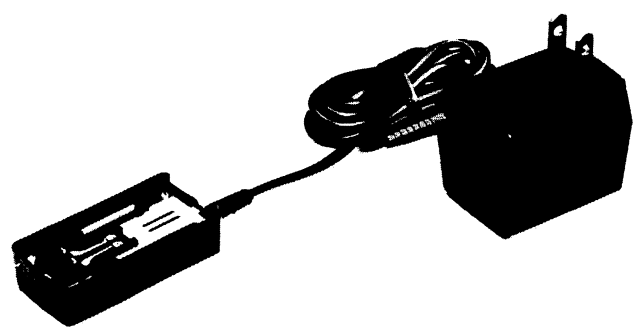
Connector No.	Pin No.	Name	Description
Control unit (X53-333X-XX)			
CN3	1	TO	Tone signal output
	2	E	Ground
	3	SDO	Tone signal coincidence discrimination signal (High: Coincides)
	4	DP	Data signal
	5	CP	Clock signal
	6	5C	5 V power supply
	7	DT	Tone serial data
	8	CI	Audio signal input
	9	ET	Tone enable
TX-RX UNIT RFU (X57-3630-XX)			
CN202 = CN2 (TX-RX unit RFU)			
CN202	1	GND	Ground
	2	VHF	VHF signal input/output
	3	GND	Ground
	4	RB	APC power detection line B
	5	SUB	Sub-receive signal

TH-77A/E

BC-9 (BATTERY CHARGER)

BT-6 (AAA MANGANESE / ALKALINE BATTERY CASE)

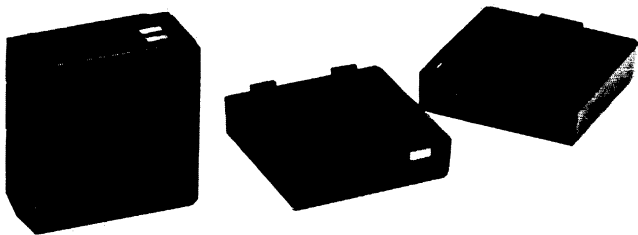
BC-9 EXTERNAL VIEW



BC-9 PARTS LIST

Ref. No.	New Parts	Parts No.	Description
		A02-0814-03	Case (Charge adapter)
		A40-0622-04	Bottom plate
		B42-3301-04	Label (LA) (K)
		E23-0494-04	Terminal \ominus
		E23-0605-04	Terminal \oplus
		G13-0852-04	Cushion
		J19-1426-03	Terminal holder

BT-6 EXTERNAL VIEW

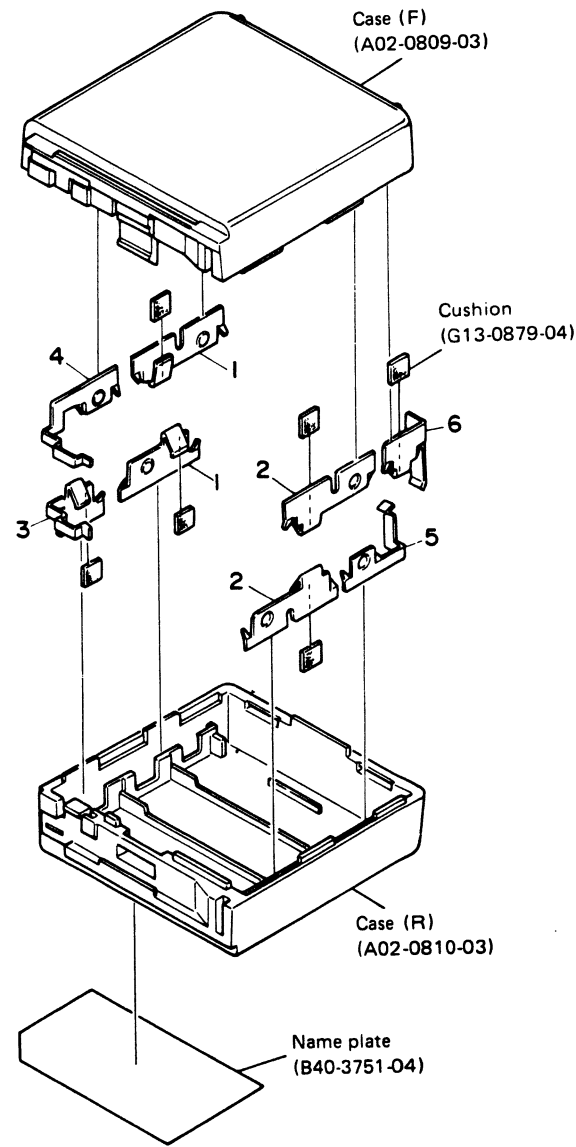


BT-6 PARTS LIST

Ref. No.	New Parts	Parts No.	Description
1		E23-0496-04	Terminal A
2		E23-0497-04	Terminal B
3		E23-0498-04	Terminal C
4		E23-0499-04	Terminal D
5		E23-0500-04	Terminal E
6		E23-0601-04	Terminal F

* : New Parts

BT-6 DISASSEMBLY

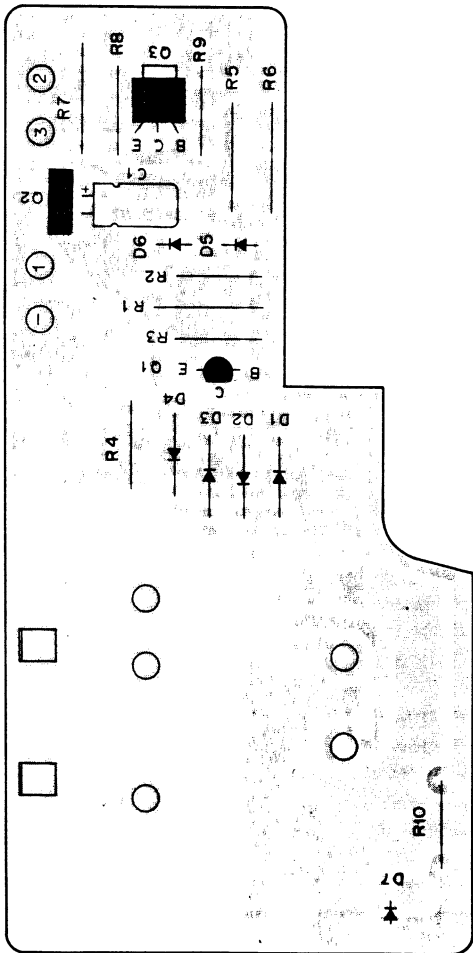


BC-10 (COMPACT CHARGER)

BC-10 EXTERNAL VIEW



BC-10 PC BOARD VIEW

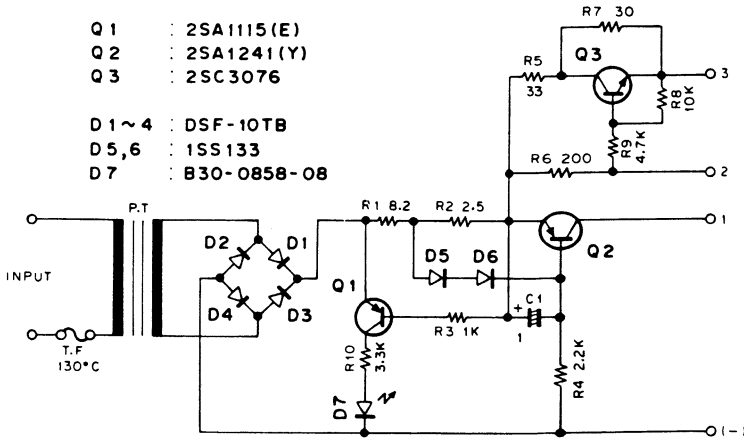


BC-10 PARTS LIST

* : New Parts

Ref. No.	New Parts	Parts No.	Description
D7		A02-0828-08	Case (Upper) K,M,M2
		A02-0829-08	Case (Upper) X,T,W
		A02-0832-08	Case (Lower)
		B30-0858-08	LED SR615D
		B50-8203-08	Instruction manual K,M,M2,X,W
		B50-8204-08	Instruction manual T
		E30-2097-08	AC power cord K,M,M2
		E30-2098-08	AC power cord X
		E30-2099-08	AC power cord T
		E30-2100-08	AC power cord W
		L01-8027-08	Power transformer 220V M,W
		L01-8111-08	Power transformer 120V K,M2
		L01-8152-08	Power transformer 240V X,T
		W02-0805-08	Module
Q1		2SA1115(E)	Transistor
Q2		2SA1241(Y)	Transistor
Q3		2SC3076	Transistor
D1-4		DSF-10TB	Diode
D5, 6		1SS133	Diode

BC-10 CIRCUIT DIAGRAM



BC-11 (RAPID CHARGER)

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

BC-11 PARTS LIST

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
BC-11						
1	1A		A02-0815-08	CASE		
2	1A,1B		A02-0817-08	BATTERY POCKET		
3	1B		B46-0411-00	WARRANTY CARD	K	
4	1B		B50-8134-08	INSTRUCTION MANUAL		
5	1B		E23-0604-05	TERMINAL		
△ 6	2A		E30-2038-08	AC CORD	K,M,M2	
△ 6	2A		E30-2072-08	AC CORD	W	
△ 6	2A		E30-2073-08	AC CORD	T	
△ 6	2A		E30-2095-08	AC CORD	X	
8	2B		H01-8128-08	ITEM CARTON CASE		
9	2B		H10-2584-02	POLYSTYRENE FOAMED FIXTURE (L)		
10	2B		H10-2585-02	POLYSTYRENE FOAMED FIXTURE (R)		
11	3A		J02-0439-05	FOOT		
12	3A		J39-0424-05	SPACER		
△ T1	2A		L01-8081-08	POWER TRANSFORMER (AC120V)	K,M2	
△ T1	2A		L01-8112-08	POWER TRANSFORMER (AC220V)	M,W	
△ T1	2A		L01-8122-08	POWER TRANSFORMER (AC240V)	T,X	
A	3A		N30-3006-41	MACHINE SCREW (M3 X 6)		
B	2A,1B		N34-4006-46	MACHINE SCREW (M4 X 6 TR)		
C	2A,1B		N35-4006-45	MACHINE SCREW (M4 X 6 BI) BLK		
D	2A		N87-3008-46	TAPTITE SCREW (φ 3 X 8 BR)		
E	1A		N89-3008-45	TAPTITE SCREW (φ 3 X 8 BI) BLK		
SW1	3A		S36-1407-05	POWER SW		
7	3B		W02-0399-08	CHARGE CONTROL UNIT		
CHARGE CONTROL UNIT (W02-0399-08)						
C1			CE04EW1V222M	ELECTRO 2200μF 35WV		
C2			CE04EW1C470M	ELECTRO 47μF 16WV		
C3			CE04EW1H010M	ELECTRO 1μF 50WV		
C4			CE04EW1E471M	ELECTRO 470μF 25WV		
C5,6			CE04EW1C100M	ELECTRO 10μF 16WV		
C7			CE04EW1A101M	ELECTRO 100μF 10WV		
C8			CE04EW1C100M	ELECTRO 10μF 16WV		
C9,10			CE04EW0J101M	ELECTRO 100μF 6.3WV		
C11			CE04EW1C330M	ELECTRO 33μF 16WV		
C12			CK45B1H102K	CERAMIC 0.001μF 50WV		
C14			CE04EW1H010M	ELECTRO 1μF 50WV		

E: Scandinavia & Europe H: Audio Club K: USA P: Canada W: Europe

A: Saudi Arabia T: England U: PX(Far East, Hawaii)

UE: AAFES(Europe) X: Australia M: Other Areas

△ indicates safety critical components.

BC-11 (RAPID CHARGER)

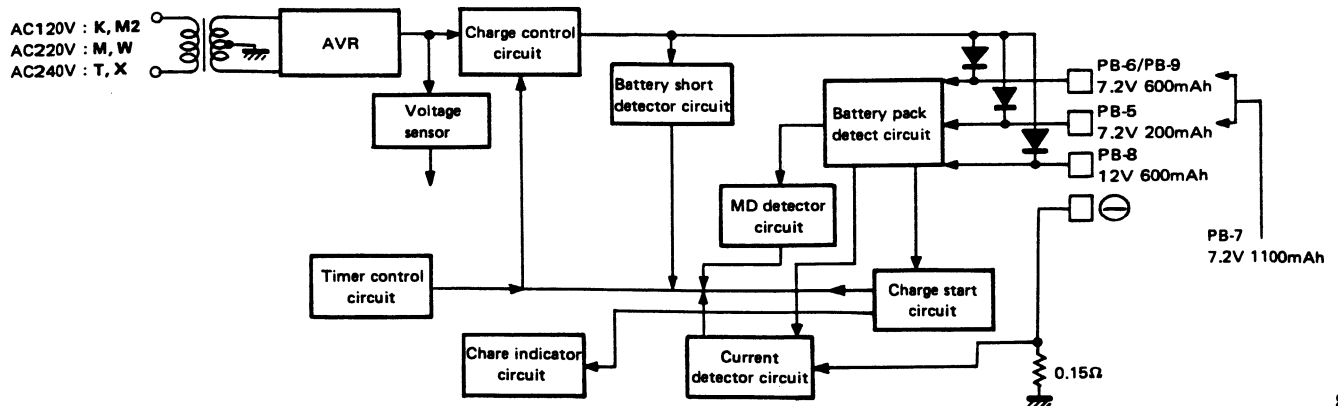
✕ New Parts

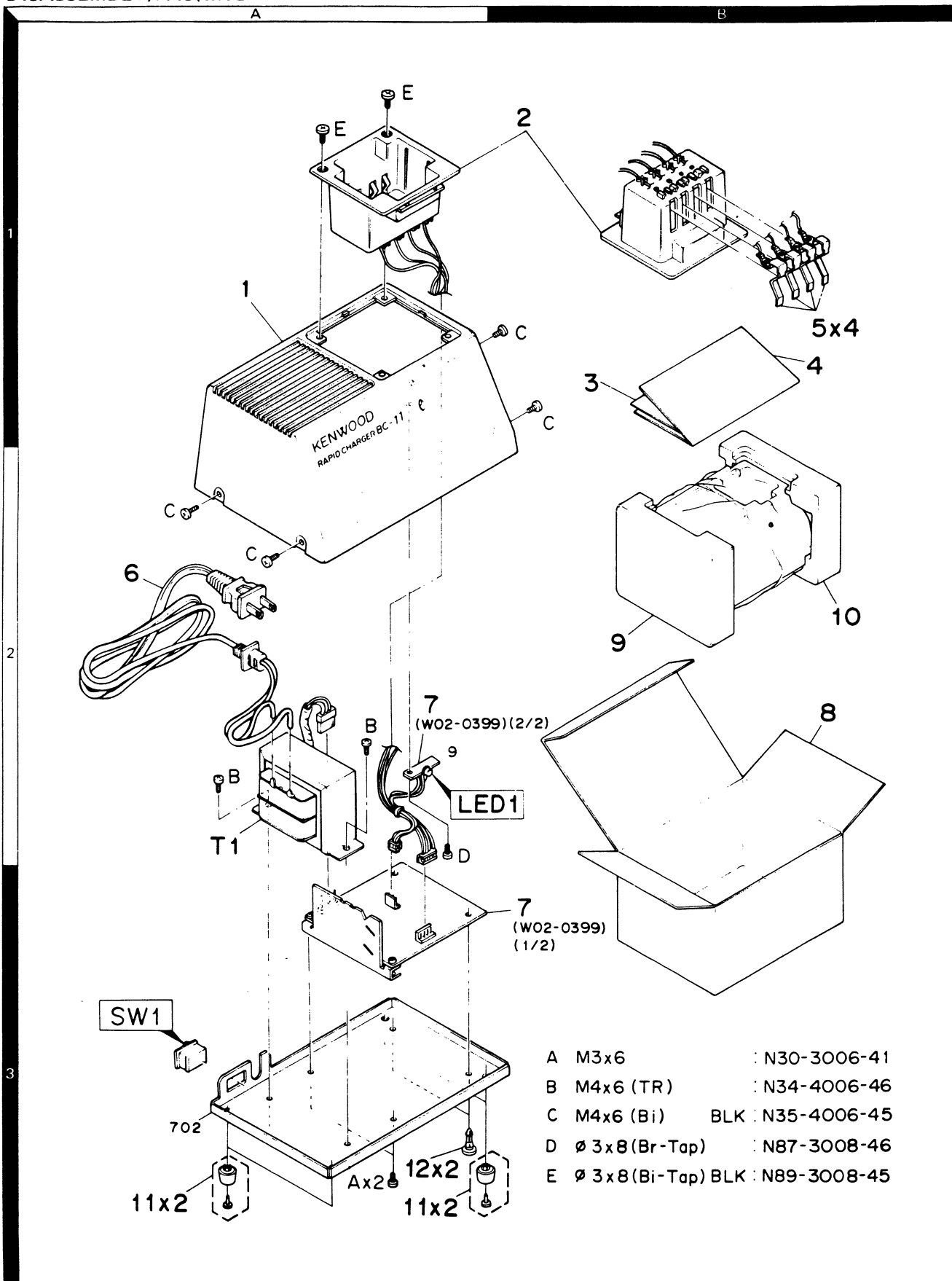
Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
MD			C91-1038-08	ELECTRO		
△ F1			F05-2525-05	FUSE (2.5A)	W,X	
△ F1			F06-2522-05	FUSE (2.5A)	M,M2,T	
△ F1			F06-2523-05	FUSE (2.5A)	K	
—			J13-0039-05	FUSE HOLDER	W	
L1			L33-0694-08	CHOKE COIL (470μH)		
R1			R92-0683-08	FL-PROOF 0.15Ω 4W		
D1-5			DSA26B	DIODE		
D6-16			DS442	DIODE		
D19-21			DS442	DIODE		
DZ1			GZA11Y	ZENER DIODE (11V)		
DZ2-4			GZA10Z	ZENER DIODE (10V)		
DZ5			GZA2.0X	ZENER DIODE (2V)		
DZ6			GZA5.6X	ZENER DIODE (5.6V)		
DZ7			GZA7.5Y	ZENER DIODE (7.5V)		
DZ8			GZA3.0X	ZENER DIODE (3V)		
IC1			STK772B	IC (CHOPPER REGULATOR)		
IC2			KCH-1003	IC (VOLTAGE SENSOR)		
IC3			AN6780	IC (TIMER)		
IC4			LA6393S	IC (DUAL OP IC)		
IC5			LC4011B	IC (QUADRUPLE NAND GATE)		
Q1			2SD600F,KF	TRANSISTOR		
Q2-5			2SA608E,F	TRANSISTOR		
Q6			2SC536E,F	TRANSISTOR		
Q7			2SA608E,F	TRANSISTOR		
Q8-10			2SC536E,F	TRANSISTOR		
Q11,12			2SA608E,F	TRANSISTOR		
Q13,14			2SC536E,F	TRANSISTOR		
LED1	2A		SLP-540D	LED (RED/GRN)		

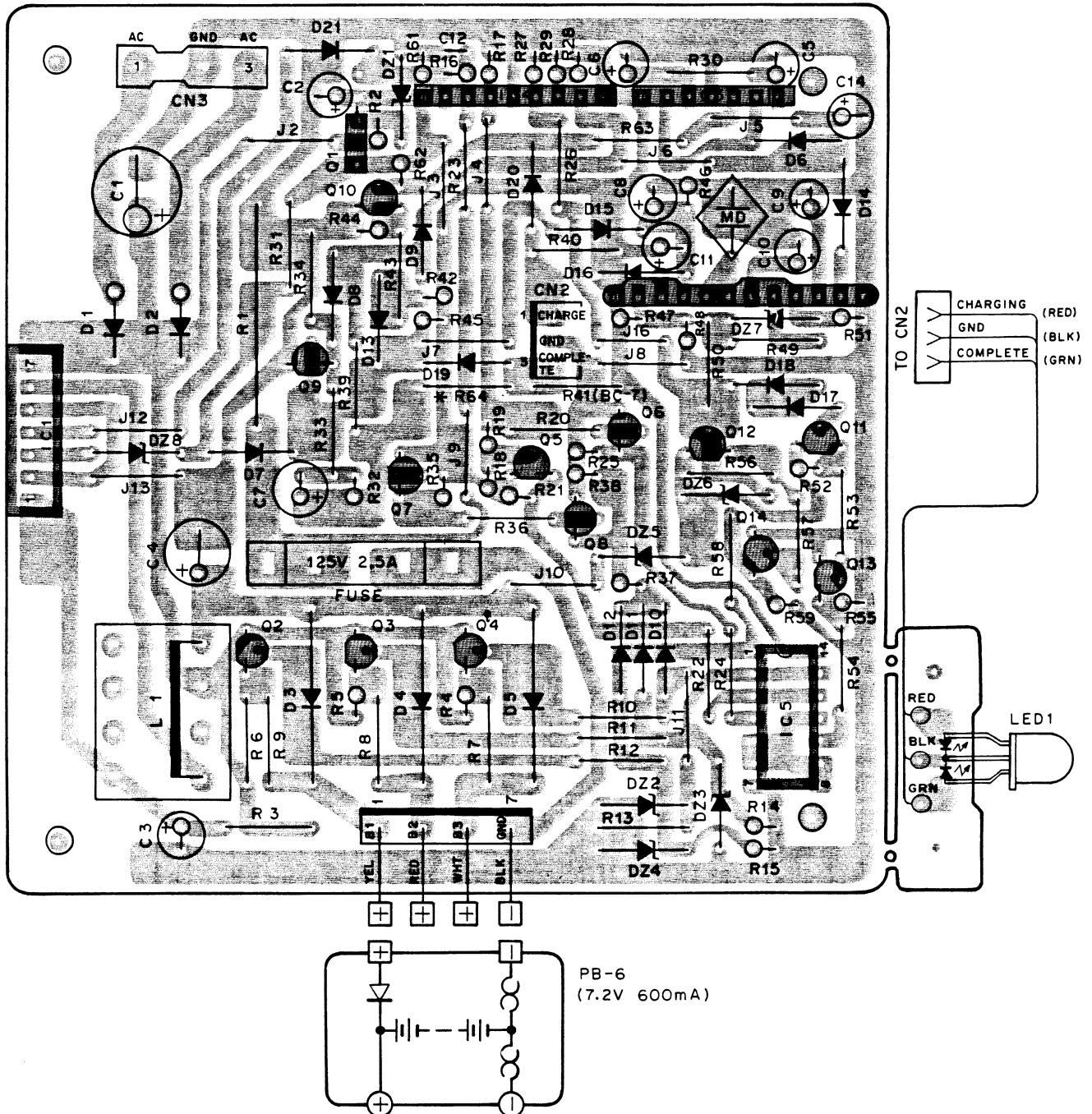
BC-11 BLOCK DIAGRAM



A	M3x6		N30-3006-41
B	M4x6 (TR)		N34-4006-46
C	M4x6 (Bi)	BLK	N35-4006-45
D	Ø 3x8 (Br-Tap)		N87-3008-46
E	Ø 3x8 (Bi-Tap)	BLK	N89-3008-45

BC-11 (RAPID CHARGER)

BC-11 PC BOARD VIEW



Q1 : 2SD600F,KF Q2-5,7,11,12 : 2SA608E,F Q6,8-10,13,14 : 2SC536E,F
 IC1 : STK772B IC2 : KCH-1003 IC3 : AN6780 IC4 : LA6393S IC5 : LC4011B
 D1-5 : DSA26B D6-16,19-21 : DS442
 DZ1 : GZA11Y DZ2-4 : GZA10Z DZ5 : GZA2.0X DZ6 : GZA5.6X DZ7 : GZA7.5Y DZ8 : GZA3.0X

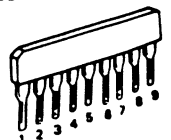
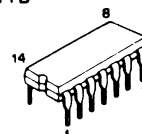
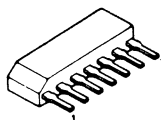
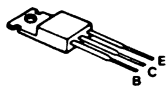
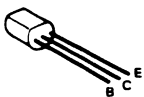
2SA608E
2SA608F

2SC536E 2SD600F
2SC536F 2SD600KF

AN6780

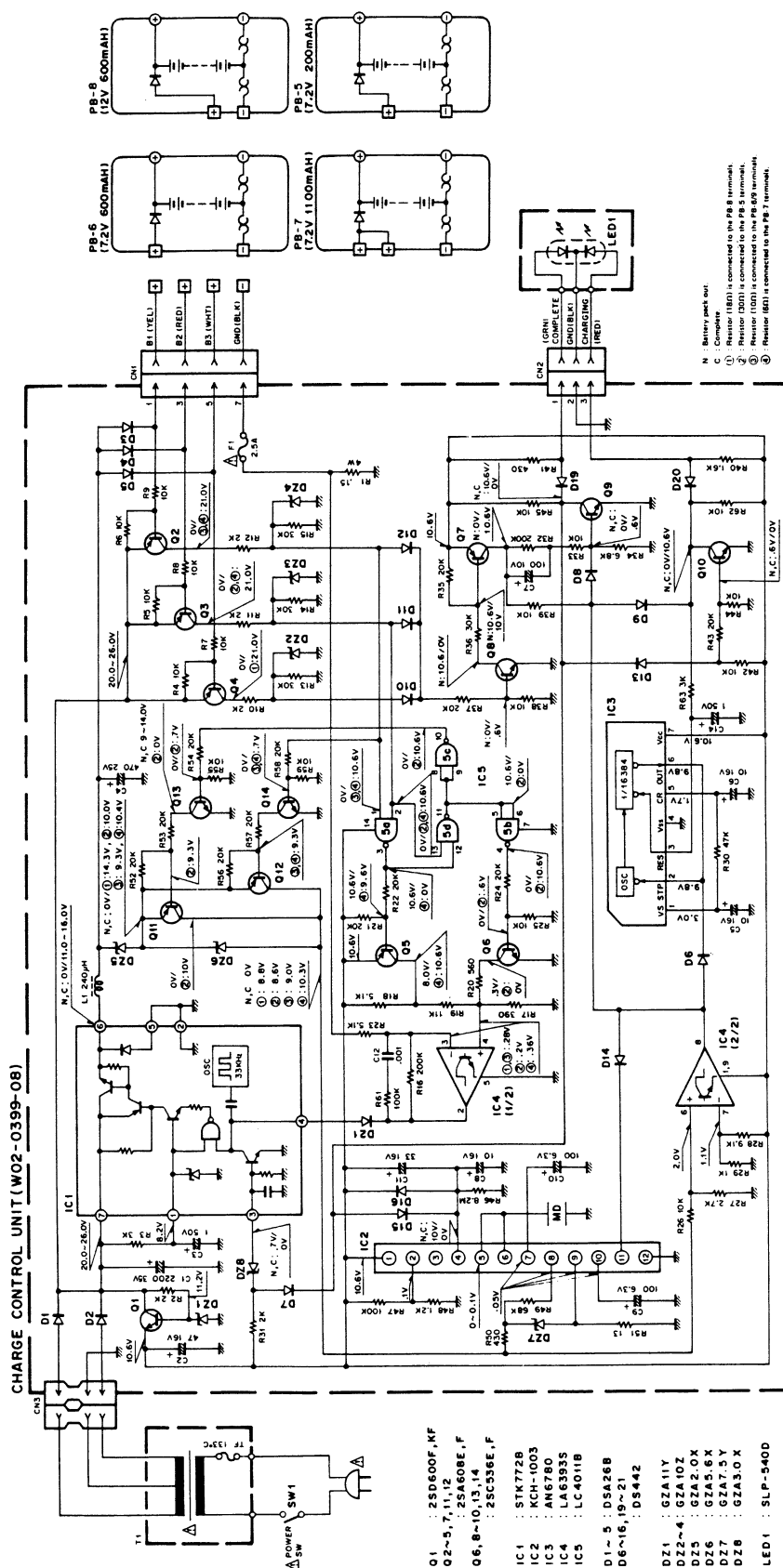
LC4011B

LA6393S



BC-11 (RAPID CHARGER)

BC-11 CIRCUIT DIAGRAM



TH-77A/E

DC-4/5(MOBILE CHARGER)/BC-12(WALL CHARGER)

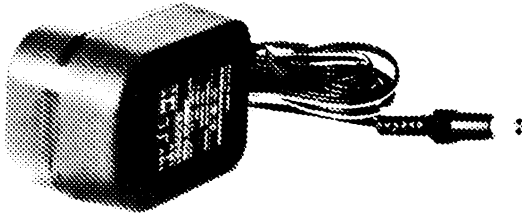
DC-4 EXTERNAL VIEW



DC-5 EXTERNAL VIEW



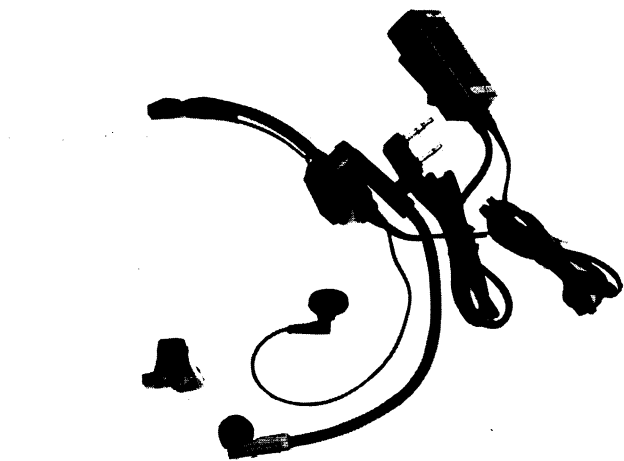
BC-12 EXTERNAL VIEW



TH-77A/E

HMC-2 (HEAD SET WITH VOX & PTT)

HMC-2 EXTERNAL VIEW



HMC-2 PARTS LIST

Ref. No.	New Parts	Parts No.	Description
VR1		A02-0840-08	Case (Front)
		A02-0841-08	Case (Rear)
		E30-2088-08	Cable with plug
		F09-0418-08	Microphone pad
		F09-0419-08	Ear pad
		J29-0427-08	Clip
		R05-4422-08	Potentiometer 50kΩ
		S31-1416-08	Slide switch PTT/VOX
		S50-1413-05	Tact switch PTT
		T18-0056-08	Earphone with cable
S1		T91-0373-18	MIC ass'y
		W02-0806-18	VOX/PTT unit
Q1		FMG2	Digital transistor
Q2		FMW2	Digital transistor
Q3		2SC2712(GR)	Chip transistor
IC1		NJM2072M	IC
D1		1SS133	Diode

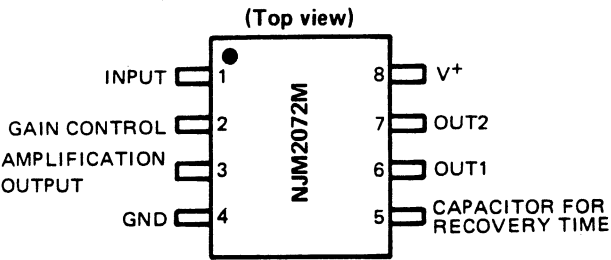
HMC-2 SPECIFICATIONS

Electrical characteristic

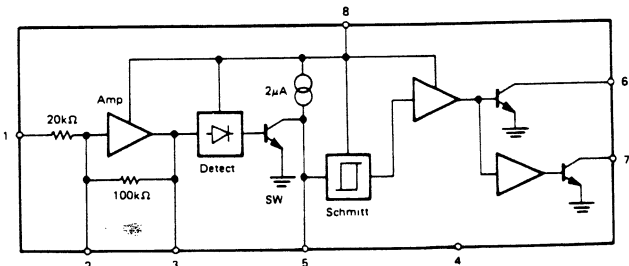
- Earphone**
 - Diameter ϕ19
 - Impedance 19Ω (1000Hz)
 - Max. input power 50mW
- Microphone**
 - Output sensitivity . . . -67.5dB (0dB = 1V/μbar 1000Hz)
 - Output impedance 1.6kΩ (1000Hz)

HMC-2 SEMICONDUCTOR DATA

• Terminal connection diagram



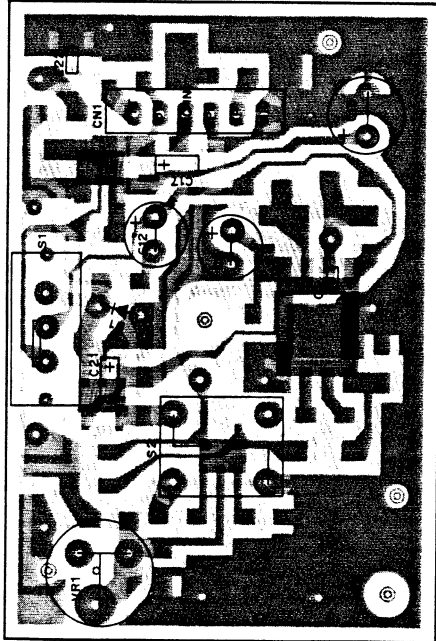
• Block diagram



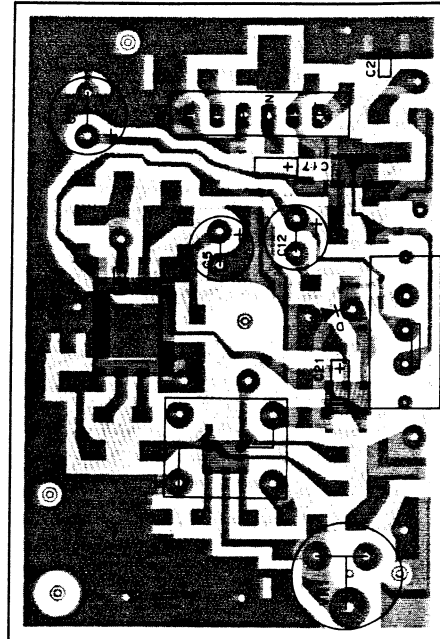
HMC-2 (HEAD SET WITH VOX & PTT)

HMC-2 PC BOARD VIEWS

Component side view



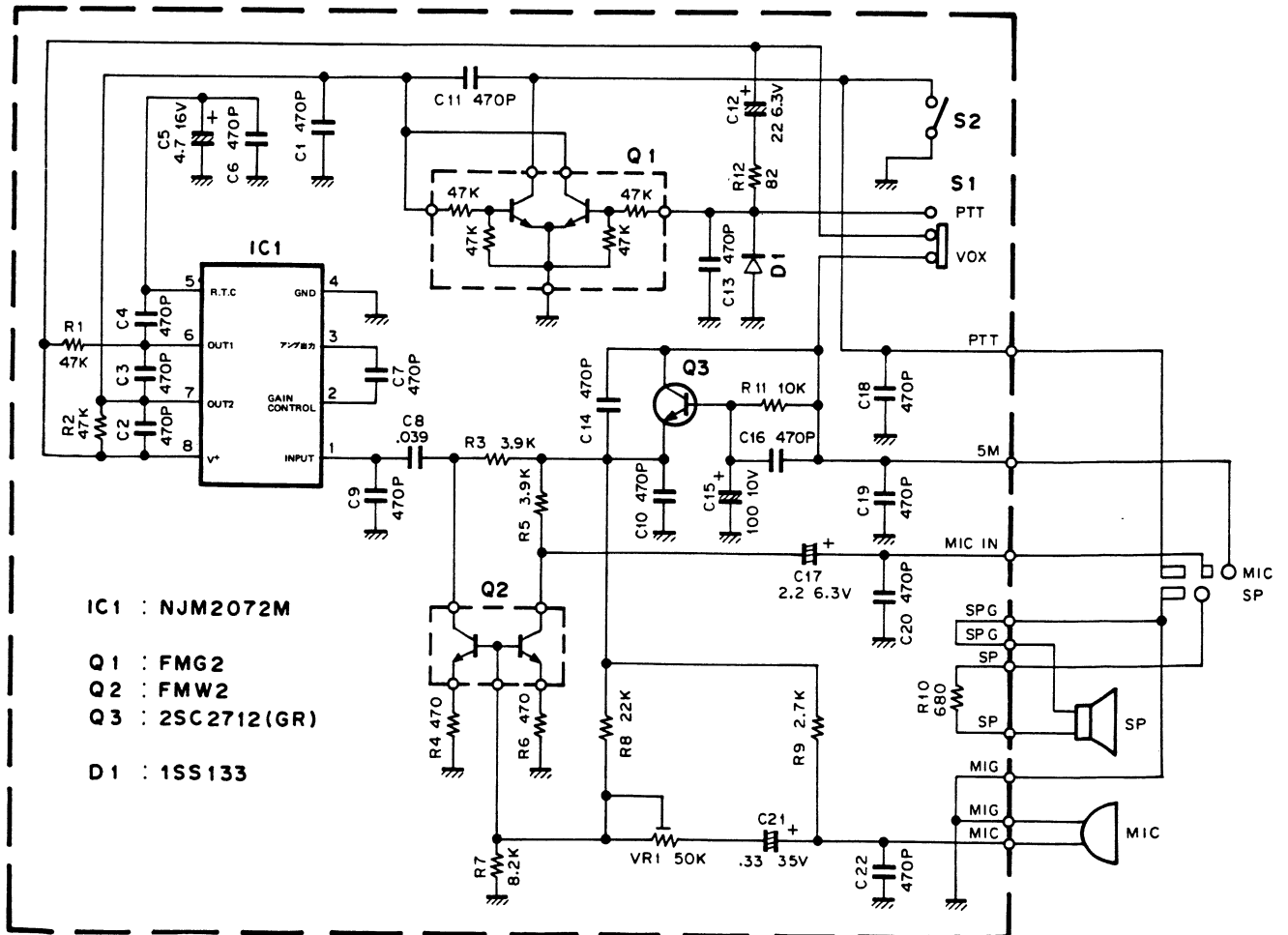
Foil side view



⋯ : Component side

▨ : Foil side

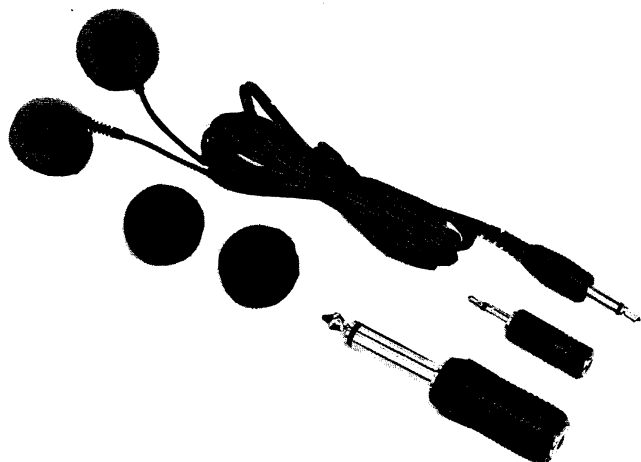
HMC-2 CIRCUIT DIAGRAM



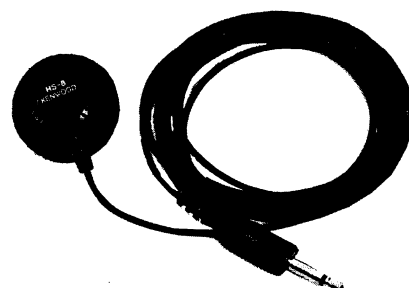
TH-77A/E

HS-7/8/9(EARPHONE)

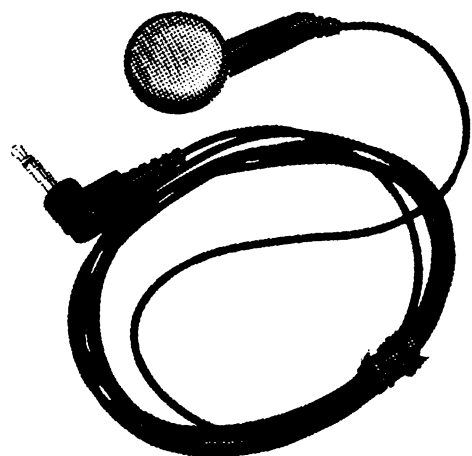
HS-7 EXTERNAL VIEW



HS-8 EXTERNAL VIEW

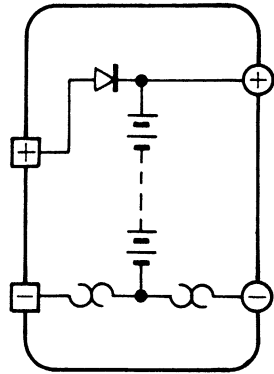


HS-9 EXTERNAL VIEW



PB-5/6/7/8/9/10(Ni-Cd BATTERY)

PB-5 EXTERNAL VIEW PB-5 CIRCUIT DIAGRAM PB-7 EXTERNAL VIEW PB-7 CIRCUIT DIAGRAM



PB-5 SPECIFICATIONS

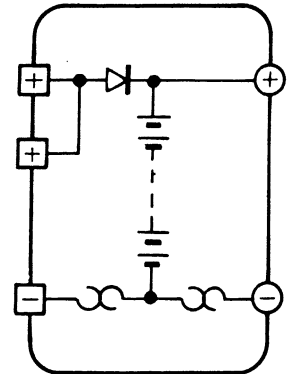
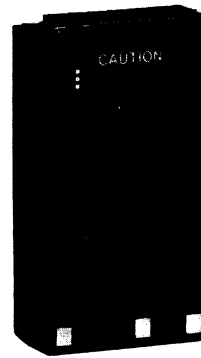
Electrical characteristic

Voltage 7.2V (1.2V x 6)

Charging current 200mAh

Dimensions 58 W x 36.5 (39.5) H x 29.5 D (mm)

Weight 80g



PB-7 SPECIFICATIONS

Electrical characteristic

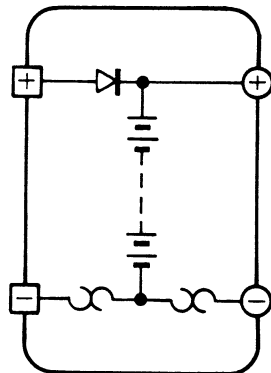
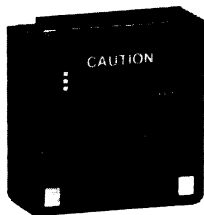
Voltage 7.2V (1.2V x 6)

Charging current 1100mAh

Dimensions 58 W x 98.5 (101.5) H x 29.5 D (mm)

Weight 300g

PB-6 EXTERNAL VIEW PB-6 CIRCUIT DIAGRAM PB-8 EXTERNAL VIEW PB-8 CIRCUIT DIAGRAM



PB-6 SPECIFICATIONS

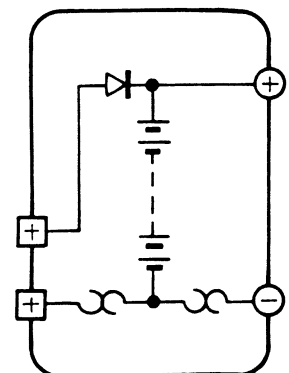
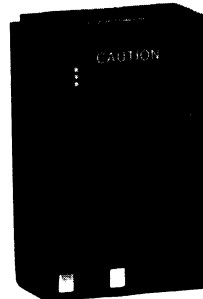
Electrical characteristic

Voltage 7.2V (1.2V x 6)

Charging current 600mAh

Dimensions 58 H x 55.5 (58.5) H x 29.5 D (mm)

Weight 180g



PB-8 SPECIFICATIONS

Electrical characteristic

Voltage 12V (1.2V x 10)

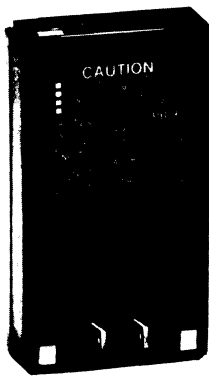
Charging current 600mAh

Dimensions 58 W x 84 (87) H x 29.5 D (mm)

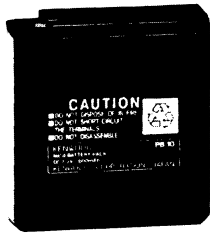
Weight 270g

PB-5/6/7/8/9/10 (Ni-Cd BATTERY)

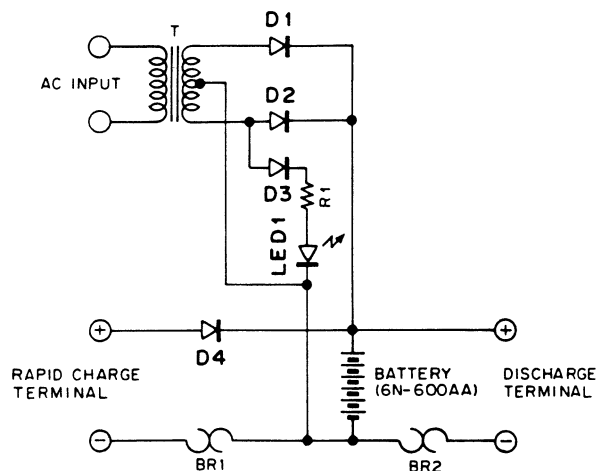
PB-9 EXTERNAL VIEW



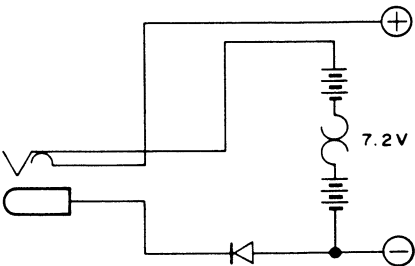
PB-10 EXTERNAL VIEW



PB-9 SCHEMATIC DIAGRAM



PB-10 SCHEMATIC DIAGRAM



PB-10 SPECIFICATIONS

Electrical characteristic
Voltage 7.2V (1.2V x 6)
Charging current 600mAh
Dimensions 58W x 55.5 (58.5) H x 29.5 D (mm)
Weight..... 180g

PB-9 SPECIFICATIONS

Electrical characteristic
Voltage 7.2V (1.2V x 6)
Charging current 600mAh
Charging input AC 100 to 120V, 50/60Hz, 2.2W
Charging output DC 8.0V, 100mA
Charging time Approx. 10 hours
Dimensions 58 W x 98.5 (101.5) H x 29.5 D (mm)
Weight 260g

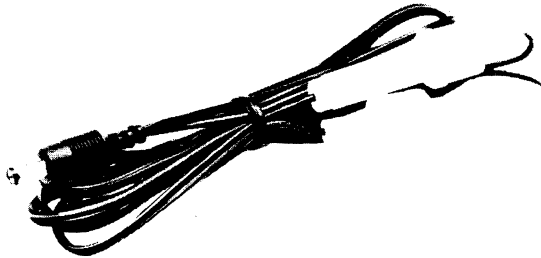
PB-5/6/7/8/9/11 CHARGING TIME

Battery Charger	PB-5	PB-6	PB-7	PB-8	PB-9	PB-10
BC-9		15	30			
BC-10	8	8	15	8	8	8
BC-11	1	1	1	1	1	1

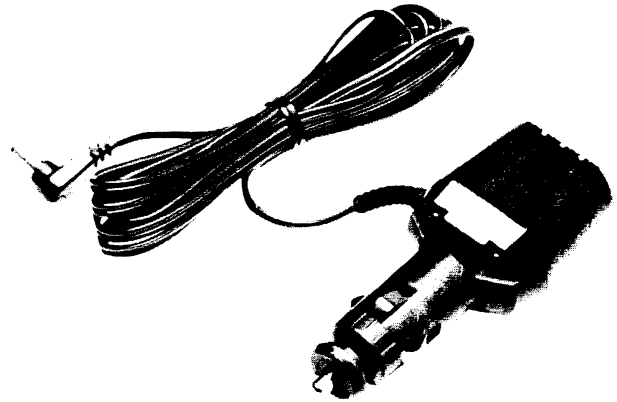
Unit : Hour

PG-2W (DC CORD)/PG-3F (PLUG WITH CORD)

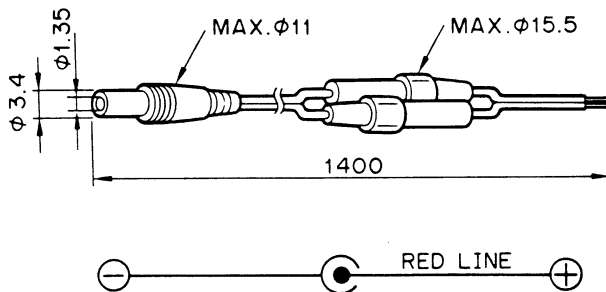
PG-2W EXTERNAL VIEW



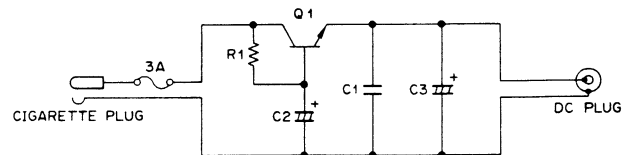
PG-3F EXTERNAL VIEW



PG-2W MAIN EXTERNAL DIMENSIONS



PG-3F CIRCUIT DIAGRAM



Q1 : 2SD717 (O,Y)

R1 : 22Ω 1/4W

C1 : 0.001μF 50V

C2 : 2.200μF 16V

C3 : 100μF 16V

TH-77A/E

SC-28/29(SOFT CASE) /WR-1(WATERPROOF CASE)

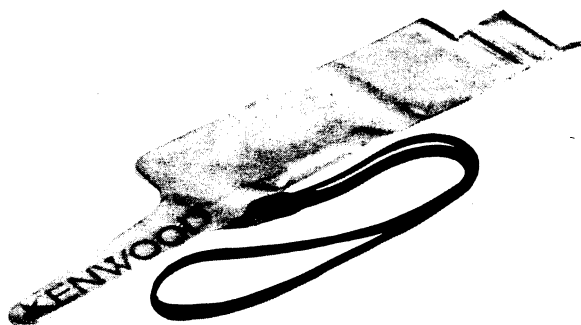
SC-28 EXTERNAL VIEW
with PB-5, PB-6, PB-10 or BT-6



SC-29 EXTERNAL VIEW
with PB-7, PB-8, or PB-9

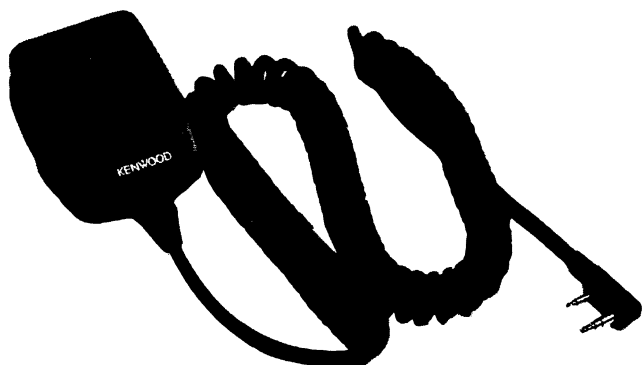


WR-1 EXTERNAL VIEW



SMC-31 / 32 (SPEAKER MICROPHONE)

SMC-31 EXTERNAL VIEW



SMC-32 EXTERNAL VIEW



SMC-31 SPECIFICATIONS

Electrical characteristic

● Speaker

Diameter $\phi 45$ (mm)
 Impedance 8Ω
 Rated input power 0.15W
 Max. input power 0.3W

● Microphone

Sensitivity $66\text{dB} \pm 3\text{dB}$ at 1300Hz
 Output impedance $2\text{k}\Omega \pm 30\%$ at 1000Hz

SMC-32 SPECIFICATIONS

Electrical characteristic

● Speaker

Diameter $\phi 28$ (mm)
 Impedance 8Ω
 Rated input power 0.5W
 Max. input power 1W

● Microphone

Sensitivity $66\text{dB} \pm 3\text{dB}$ at 1300Hz
 Output impedance $2\text{k}\Omega \pm 30\%$ at 1000Hz

SMC-31 PARTS LIST

* : New Parts

Ref. No.	New Parts	Parts No.	Description
		D10-0605-08	PTT lever
		E30-2110-05	Curl cord ass'y
		J19-1360-08	Clip
		T07-0219-08	Speaker
		T97-1024-08	Microphone

SMC-32 PARTS LIST

* : New Parts

Ref. No.	New Parts	Parts No.	Description
		E30-2127-08	Curl cord ass'y

SMC-33 (SPEAKER MICROPHONE)

SMC-33 SPECIFICATIONS



SMC-33 SPECIFICATIONS

Electrical characteristic

- **Speaker**
Diameter $\phi 28$ (mm)
Impedance 8Ω
Rated input power 0.5W
Max.input power 1W
- **Microphone**
Sensitivity $58\text{dB} \pm 3\text{dB}$ ($0\text{dB} = 1\text{V}/\mu\text{bar}$) at 1300Hz
Output impedance $2\text{k}\Omega \pm 30\%$ at 1000 Hz

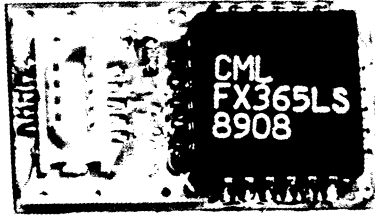
SMC-33 PARTS LIST

* : New Parts

Ref No.	New Parts	Parts No.	Description
		E30-2196-08	Microphone with Speaker
		T91-0392-05	Condenser MLC

TSU-7(CTSS UNIT)

TSU-7 PC BOARD VIEW



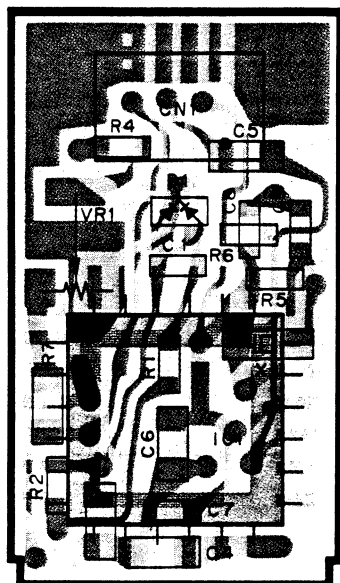
TSU-7 PARTS LIST

Ref. No	Address	Rart	Rarts No.	Description	Desti- nation	Re- marks
T S U - 7 (X 5 2 - 3 1 7 0 - 0 0)						
X1		*	G10-0692-04	CUTTON		
IC1		*	H21-0704-04	CUTTON		
D1			L78-0062-05	STAL (1MHz)		
CN1			FX365LS	IC		
VR1			DAN202U	DIODE		
R1			E40-5341-05			
R2			R12-6526-05	TRIM. POT. (47K)		
R4			RK73BG1J274J	CHIP R J 270K		
R5			RK73BG1J824J	CHIP R J 820K		
R6			RK73BF1J103J	CHIP R J 10K		
C1			RK73BG1J105J	CHIP R J 1M		
C2			RK73BG1J473J	CHIP R J 47K		
C4-6			CK73GB1H471K	CHIP C K 470pF		
C7			C92-0521-05	CHIP TAN 20WV		
C8. 9			CK73FB1E104K	CHIP C K 0. 1UF		
			CK73GB1H471K	CHIP C K 470pF		
			CC73GCH1H221J	CHIP C J 220pF		

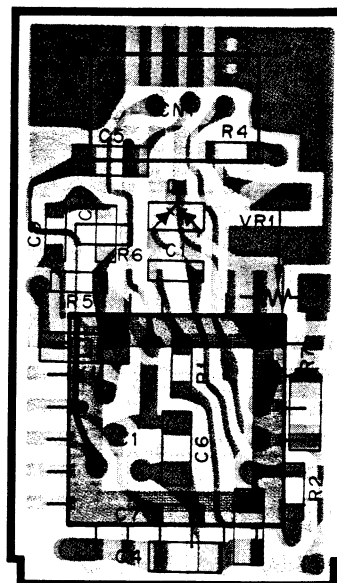
TSU-7(CTCSS UNIT)

PC BOARD VIEWS

(Component side view)



(Foil side view)



□ : Component side pattern ■ : Foil side pattern

CIRCUIT DIAGRAM

